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BROAD SCAN ANALYSIS OF HUMAN ADIPOSE TISSUE:
VOLUME III - SEMIVOLATILE ORGANIC COMPOUNDS

By

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Field Studies Branch (TS-798)
Design and Development Branch
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16. ABSTRACT The U.S. EPA's Office of Toxic Substances (OTS) maintains a unique capability for monitoring human exposure to potentially toxic substances through the National Human Adipose Tissue Survey (NHATS). The primary focus for NHATS has been to document trends in human exposure to environmentally persistent contaminants, specifically organochlorine pesticides and polychlorinated biphenyls (PCBs). EPA/OTS has recognized a need to expand the use of the NHATS program to provide a more comprehensive assessment of toxic substances that are accumulated in adipose tissue. This report deals specifically with the measurement of semivolatile organic chemicals in composited adipose tissue specimens from the FY82 NHATS repository. Quantitative data for organochlorine pesticides, PCBs, polynuclear aromatic hydrocarbons, phthalate esters, and phosphate triesters were determined for each composite. The frequencies of detection for each of the compounds based on the specific age group and census division are detailed in the report. The feasibility of determining other halogenated aromatic compounds, including polybrominated biphenyls, polychlorinated terphenyls, and polychlorinated diphenyl ethers, using this method was demonstrated through the analysis of spiked adipose tissue samples.		
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PREFACE

This executive summary is the third of a five-volume series that details the broad scan chemical analysis of composite adipose tissue samples. These composite samples were prepared from individual specimens obtained from the Environmental Protection Agency's (EPA) National Human Adipose Tissue Survey (NHATS) fiscal year 1982 (FY82) repository.

This volume summarizes data generated from the analyses of the composite samples for general semivolatile organic compounds. Volume I provides a synopsis of all analytical efforts compiled under the broad scan analysis program. Volume II deals specifically with the chemical analysis of the NHATS composites. Volumes IV and V are for general volatile organics, polychlorinated dibenzo-p-dioxin (PCDD) and dibenzofurans (PCDF), and trace elements, respectively. The statistical analyses of the data reported in these volumes will be reported separately by the EPA's Office of Toxic Substances (OTS) Design and Development Branch contractor, Battelle Columbus Laboratories.

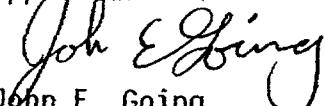
The entire series of reports are referenced as follows:

- Stanley JS. 1986. Broad scan analysis of human adipose tissue: Volume I: Executive summary. EPA 560/5-86-035.
- Stanley JS. 1986. Broad scan analysis of human adipose tissue: Volume II: Volatile organic compounds. EPA 560/5-86-036.
- Stanley JS. 1986. Broad scan analysis of human adipose tissue: Volume III: Semivolatile organic compounds. EPA 560/5-86-037.
- Stanley JS. 1986. Broad scan analysis of human adipose tissue: Volume IV: Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs). EPA 560/5-86-038.
- Stanley JS, Stockton RA. 1986. Broad scan analysis of human adipose tissue: Volume V: Trace elements. EPA-560/5-86-039.

These method development, sample analyses, and reporting activities were completed for the EPA/OTS Field Studies Branch (FSB) broad scan analysis of human adipose tissue program (EPA Prime Contract Nos. 68-02-3938 and 68-02-4252, Work Assignments 8 and 21, respectively, Ms. Janet Remmers, Work Assignment Manager, and Dr. Joseph Breen, Project Officer).

The samples were prepared with the assistance of Ms. Leslie Moody and Mr. Steven Turner. The HRGC/MS methods development and sample analyses were conducted by Mr. Steven Turner, Ms. Ruth Blair, Ms. Kathy Boggess, and Mr. Jon Onstot. The compositing scheme used to prepare the samples from the NHATS repository was provided by Dr. Gregory Mack, Battelle Columbus Laboratories, under contract to the EPA/OTS Design and Development Branch (Mr. Phillip Robinson, Task Manager and Ms. Cindy Stroup, Program Manager).

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EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency's Office of Toxic Substances (EPA/OTS) maintains a unique program for monitoring human exposure to potentially toxic substances. The National Human Adipose Tissue Survey (NHATS) is a statistically designed annual program to collect and analyze a nationwide sample of adipose tissue specimens for toxic compounds. The primary focus for NHATS has been to document trends in human exposure to environmentally persistent contaminants, specifically organochlorine pesticides and polychlorinated biphenyls (PCBs).

EPA/OTS has recognized the need to provide a more comprehensive assessment of the toxic substances that accumulate in adipose tissue. The NHATS specimens collected during fiscal year 1982 (FY82) were designated for "broad scan analysis" to determine volatile and semivolatile organic compounds and trace elements.

This volume of the final report deals specifically with the measurement of semivolatile organic chemicals in composited adipose tissue specimens from the FY82 NHATS repository. The objectives of this part of the study were (1) to develop an analytical method based on high resolution gas chromatography/mass spectrometry (HRGC/MS) for determination of semivolatile organic chemicals in human adipose tissue and (2) to complete the analysis of the FY82 NHATS specimens as composited for semivolatile organic compounds.

An analytical method for the broad scan analysis of human adipose tissue for semivolatile organic compounds was identified and evaluated. The analytical method is based on gel permeation chromatography, Florisil fractionation, and high resolution gas chromatography/mass spectrometry (HRGC/MS).

Forty-six composite samples were prepared from the FY82 NHATS repository according to a study design prepared by the EPA/OTS design and development contractor, Battelle Columbus Laboratories. The composite samples represented the nine U.S. census divisions and three age groups (0-14, 15-44, and 45-plus).

Quantitative data for organochlorine pesticides, polychlorinated biphenyls (PCBs), chlorobenzenes, phthalate esters, phosphate triesters, and polynuclear aromatic hydrocarbons were determined for each composite. This report details the frequencies of detection for each of the compounds by age group and census division. The feasibility of determining other halogenated aromatic compounds, including polybrominated biphenyls, polychlorinated terphenyls, and polychlorinated diphenyl ethers, using this method was demonstrated through the analysis of spiked adipose tissue samples. The quantitative data for the target analytes described in this report have been submitted along with all supporting quality control data to Battelle Columbus Laboratories for statistical analysis.

Characterization of additional chromatographic peaks in the HRGC/MS data to identify other compounds of interest to the Agency has been initiated under a separate work assignment (Contract No. 68-02-4252, Work Assignment No. 23).

This study represents a major step in the advancement of EPA's National Human Monitoring Program to monitor exposure to toxic organic chemicals. The database for the number of xenobiotic organic compounds detected in adipose tissue has been expanded. The predominant compounds noted are organochlorine pesticides and PCBs, which have previously been monitored through packed column gas chromatography/electron capture detection (PGC/ECD) techniques. The HRGC/MS method provides an additional confidence level for determination, however, since identification is based on matches of both retention time and mass spectra. The detail on PCB levels is also expanded as a result of identifying specific degree of chlorination (homologs) and providing quantitation of individual responses. Previous NHATS analyses for PCBs based on the PGC/ECD method have resulted in semiquantitative data based on a single response.

I. INTRODUCTION

The National Human Adipose Tissue Survey (NHATS) is the main operative program of the National Human Monitoring Program. The National Human Monitoring Program (NHMP) was first established by the U.S. Public Health Service in 1967 and was subsequently transferred to the U.S. Environmental Protection Agency (EPA) in 1970. During 1979 the program was transferred within EPA to the Exposure Evaluation Division (EED) of the Office of Toxic Substances (OTS).

NHATS is an annual program to collect a nationwide sample of adipose tissue specimens and to chemically analyze them for the presence of toxic compounds. The objective of the NHATS program is to detect and quantify the prevalences of toxic compounds in the general population. The NHATS data are used to address part of OTS's mandate under the Toxic Substances Control Act (TSCA) to assess chemical risk to the U.S. population. The specimens are collected from autopsied cadavers and surgical patients according to a statistical survey design (Lucas, Pierson, Myers, Handy 1981). The survey design ensures that specified geographical regions and demographic categories are appropriately represented to permit valid and precise estimates of baseline levels, time trends, and comparisons across subpopulations.

The data for the NHATS are generated by collecting and chemically analyzing adipose tissue specimens for selected toxic substances. Historically, organochlorine pesticides and polychlorinated biphenyls (PCBs) have been the compounds of interest.

A. Broad Scan Analysis Strategy

EPA/OTS recognized the need to provide a more comprehensive assessment of the toxic substances that accumulate in adipose tissue. An aggressive strategy to assess TSCA-related substances that persist in the adipose tissue of the general U.S. population has been developed by EED. The NHATS specimens collected during fiscal year 1982 (FY82) were selected for a broad scan analysis of volatile and semivolatile organic TSCA-related chemicals and trace elements (Mack, Stanley 1984).

The initiative to achieve a more comprehensive assessment of toxic substances in human adipose tissue necessitates a modification of the existing analytical procedures. Data reported on NHATS specimens up to the FY82 collection are limited to organochlorine pesticides and PCBs based on packed column gas chromatography/electron capture detector (PGC/ECD) analysis (Yobs 1971; Kutz, Yobs, Strassman 1976; Kutz, Sovocool, Strassman, Lewis 1976; Kutz, Yoos, Strassman, Viar 1977; Kutz, Strassman, Sperling 1979; Sherma, Beroza 1980). Limited data have been reported for mass spectrometric analysis of pooled NHATS specimen extracts for specific compound classes such as polybrominated biphenyls (PBBs) (Lewis, Sovocool 1982) and polychlorotriphenyls (PCTs) (Wright, Lewis, Crist, Sovocool, Simpson 1978).

B. Work Assignment Objectives

The objectives of this work assignment were to (1) identify appropriate analytical methods for a broad scan analysis of human adipose tissue based on high resolution gas chromatography/mass spectrometry (HRGC/MS) detection; (2) conduct preliminary evaluation of the analytical procedures; and (3) complete the sample workup and analysis of 46 composite samples prepared from the NHATS specimens collected during FY82.

The broad scan analysis approach based on HRGC/MS is necessary to identify additional compounds that may be of concern to EPA under the mandates of TSCA. The target detection range for analytes by the HRGC/MS method, as specified in the current NHATS strategy (Mack, Stanley 1984), was 0.05 to 0.10 µg/g.

C. Organization of This Report

This report deals specifically with the application of the broad scan analysis concept to determine semivolatile organic compounds in human adipose tissue. Following this introductory section, Section II presents recommendations for additional method development and routine application of the concept. Section III is the experimental section and describes the experimental design, analytical procedures, and results of the preliminary method evaluation studies. Section IV reports results of the HRGC/MS and HRGC/selective detector analyses of the composited samples. Section V presents the results of an extensive quality assurance/quality control program conducted along with the sample analysis. Section VI provides references. Complete data reports of the HRGC/MS analysis by specific census division are reported in Appendix A.

II. RECOMMENDATIONS

The analytical method described in this report and modified as recommended below should be fully validated through additional intra- and inter-laboratory analyses. This effort is necessary to define the methods limitations fully (accuracy, precision, limits of detection (LOD) and limits of quantitation (LOQ), and quality control requirements for reporting valid data. The LODs and LOQs for individual analytes should be determined experimentally through replicate analysis of spiked tissue samples. The HRGC/MS and the PGC/ECD methods should be evaluated using homogenized split samples to determine the comparability of data for the organochlorine pesticides and PCBs. This effort is necessary to determine whether it will be possible to effectively extend trend lines from the PGC/ECD data from previous NHATS analysis programs.

Before proceeding with these validation and comparability studies, however, the analytical method described in this report should be modified to include at least two additional internal standards for quantitation. Surrogate compounds that will fractionate in the more polar Florisil fractions are necessary to fully evaluate method performance on a per sample basis. Deuterated phthalate esters that are commercially available should be considered as surrogates in further evaluation of the analytical method.

For continued broad scan analysis projects there is a need to establish sufficient characterized reference samples for use as quality control samples. These QC samples should be available in quantities comparable to the 20 g composited tissue samples. This type of QC sample could be developed from lipid materials extracted from human adipose tissue. The lipid materials should be thoroughly homogenized and the background levels of semivolatile organic analytes established through replicate analysis. Once this reference material has been characterized, it could be spiked with additional analytes for positive documentation of method performance.

Additional method development effort is needed to achieve a more expedient of removal bulk lipid from the samples. The current analytical methodology, although effective, requires considerable time for preparation of the samples.

Effort is also necessary in the area of developing HRGC/selective detector analysis methods to provide data for target analytes on a routine basis. Specifically, HRGC/ECD analysis of adipose tissue could provide data on chlorobenzenes, organochlorine pesticides and specific PCB isomers. This approach would require smaller sample sizes and result in more expedient sample preparation while maintaining the necessary sensitivity to achieve 1-10 ng/g (ppb) detection levels. HRGC/selective detector analysis could also be applied to monitoring of phosphate triesters on a routine basis.

Some consideration should be given to evaluation of alternate HRGC/MS techniques including selecting ion monitoring (SIM), negative chemical ionization mass spectrometry (NCI), and mass spectrometry/mass spectrometry (MS/MS) to lower detection limits and increase specificity for compound classes such as organochlorine pesticide, polychlorinated biphenyls, polybrominated biphenyls (PBB), polychlorinated terphenyls (PCT), polychlorinated diphenyl ethers (PCDE), and polychlorinated naphthalenes (PCN).

III. EXPERIMENTAL

This section of the report describes:

- A. collection and storage of NHATS specimens;
- B. sample compositing activity;
- C. broad scan HRGC/MS analysis procedure;
- D. the analytical procedure for toxaphene analysis; and
- E. preliminary method validation experiments.

A. Collection and Storage of NHATS Specimens

The adipose specimens were originally collected during FY82 (October 1, 1981 through September 30, 1982) for determination of organic chlorine pesticide and PCB residues. The specimens were collected during surgical procedures or as part of postmortem examinations. The cooperating physicians and pathologists were requested to acquire at least 5 g of high lipid adipose (subcutaneous, perirenal, or mesenteric), taking precautions to avoid contamination that might result in direct contamination from chemicals such as solvents, paraffin, disinfectants, preservatives, or plastics.

The cooperators were given no specific instructions to avoid potential contamination that might arise from background contribution (airborne levels) of solvents or metals.

The adipose tissue specimens were sealed in glass jars and frozen (-20°C) following collection. The specimens were shipped in insulated coolers packed on dry ice. The FY82 specimens were originally received and stored at EPA's Toxicant Analysis Center (TAC) at Bay St. Louis, MS. The NHATS repository was transferred to Midwest Research Institute (MRI) during September 1982. The specimens were shipped in insulated coolers and packed on dry ice. The specimens were inventoried at MRI upon receipt and were then stored in freezers (-20°C). Precautions were taken to ensure that the specimens remained frozen during all inventory and sample handling procedures.

B. Sample Compositing Activity

The NHATS FY82 adipose tissue specimens were subsampled and composited as specified by EPA's Design and Development Branch contractor; Battelle Columbus Laboratories (BCL). Prior to preparation of the composites, all of the FY82 specimens were retrieved from the NHATS repository and the individual specimens bottles were grouped according to the designated compositing scheme provided by BCL. Care was taken to ensure that the specimens were not allowed to reach room temperature. The specimen were stored on dry ice during this process and were returned to a freezer (-20°C) once all individual specimen for a specific composite had been located.

All specimens for a specific composite were removed from the freezer at the same time for the compositing effort. The specimens were placed on dry ice so they would remain frozen during the compositing effort. Each specimen was handled separately and each was subsampled for the composites for both volatile and semivolatile organic analysis. This resulted in minimum handling of each specimen. Once the specimen had been subsampled for each composite it was placed on dry ice. After all specimen had been added to the composites, the batch was returned to the freezer.

All samples were handled in a positive pressure Plexiglas hood of approximately 94.5 L volume to prevent contamination from laboratory air. Compressed air was filtered through a charcoal trap to remove potential volatile contaminants from air supply before it entered the hood. The subsamples were manipulated with the rounded end of a lab spoon-type stainless steel spatulas and placed in 40-mL vials with TFE septa caps. Each specimen was manipulated with a separate clean spatula. All weighings were performed to ± 0.1 g on a Mettler open pan balance placed in the hood.

The nominal mass of each individual specimen necessary to achieve a final composite mass of 20 g was determined before proceeding with the physical compositing. For example, if a composite consisted of 20 specimens, 1.0 g of each specimen was necessary to achieve a final composite mass of 20 g. Separate composite samples were prepared for both semivolatile (Stanley 1986c) and volatile organic analysis. The individual specimens were added first to the composites for the semivolatile organic analysis. This resulted in the addition of a total available specimen, in some cases, to the semivolatile organic composite only. As a result, several of the volatile organic

composites contain somewhat less than the target 20 g of tissue mass. The samples resulting from the 46 volatile organic composites ranged from 5.1 to 25.6 g total mass with an average mass of 19 g.

Prior to the compositing effort, the vials were washed in soap and water, rinsed thoroughly with tap water, deionized water, bulk acetone, Burdick and Jackson (B&J) acetone, and B&J hexane, and then placed in an oven at 200°C for 48 h before use. The spatulas were washed and rinsed as above and were dried for at least 5 min in the oven.

All composites were stored on dry ice until transferred to a freezer (-20°C). Before being placed in the freezer in the 40-mL vials, the composited samples were grouped by census division and placed in 1.0-qt jars (cleaned as above) containing a layer of activated charcoal and closed with a TFE-lined cap. The samples were stored in the freezer until analysis.

The composite samples ranged from 9.0 to 28.1 g total mass with an average mass of 20.9 g for the 46 composites. The amounts of each NHATS specimen added to a specific composite are detailed in Volume II of this report series (Stanley 1986b). The demographic characteristics for each composite (Table 1) were determined by BCL from the individual specimen data.

C. Broad Scan HRGC/MS Analysis Procedures

1. Selection of Analytical Methods/Target Analytes

a. Analytical Methods

The analytical methods that have been used to achieve the analysis of human adipose tissue samples for specific xenobiotic compounds have been previously reviewed (Cramer, Miller, Going 1981). The biggest concern in establishing any analytical method for adipose tissue is removing the bulk matrix without losing the target analytes. This has been achieved by various approaches including liquid-liquid partitioning (acetonitrile/hexane), chemical degradation (alcoholic potassium hydroxide saponification or concentrated sulfuric acid digestion), low temperature precipitation, adsorption on calcium or cesium silicates, and separation of the analytes based on gel permeation chromatography (GPC).

GPC presents the most viable option of these analytical procedures for bulk lipid cleanup for the broad scan analysis concept. The advantage of GPC is its ability to separate xenobiotic materials (polar and nonpolar) from the lipid matrix based on size separation. The application of GPC for the separation and cleanup of lipid materials from biological (Tessari, Griffin, Aaronson 1980; MacLeod, Hanisch, Lewis 1982; Ribick, Dubay, Petty, Stalling, Schmitt 1982; Norstrom, Simon, Mulvihill 1986) as well as environmental samples (Lopez-Avila, Haile, Goddard et al. 1981) has been previously documented. Figure 1 is an example of the GPC separation of various compounds and compound classes from fish lipids using GPC. Cleanup of lipids based on the other options may result in low recoveries or the loss of the more polar or labile molecules.

Table 1. Demographic Characteristics for the FY82 NHATS Composites - Semivolatile Organic Analysis^a

Census region ^b	Census division ^c	Age group ^d	Composite number	No. of specimens	Percent white	Percent male
NC	EN	1	1	18	77.8	100.0
	EN	1	2	20	80.0	0.0
	EN	2	1	20	90.0	50.0
	EN	2	2	19	89.5	42.1
	EN	2	3	19	89.5	52.6
	EN	3	1	18	94.4	55.6
	EN	3	2	18	88.9	55.6
	EN	3	3	14	100.0	50.0
<hr/>						
NC	WN	1	1	13	92.3	53.8
	WN	2	1	17	100.0	64.7
	WN	3	1	15	93.3	60.0
	WN	3	2	15	93.3	53.3
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NE	MA	1	1	11	90.9	81.8
	MA	1	2	13	76.9	61.5
	MA	2	1	24	83.3	50.0
	MA	2	2	22	86.4	54.5
	MA	3	1	20	95.0	50.0
	MA	3	2	20	85.0	40.0
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NE	NE	1	1	16	87.5	56.3
	NE	2	1	21	95.2	57.1
	NE	3	1	19	100.0	47.4
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S	ES	1	1	26	88.5	53.8
	ES	2	1	16	87.5	100.0
	ES	2	2	17	94.1	0.0
	ES	3	1	17	100.0	52.9
	ES	3	2	9	0.0	55.6
<hr/>						
S	SA	1	1	20	100.0	45.0
	SA	1	2	14	0.0	64.3
	SA	2	1	25	100.0	100.0
	SA	2	2	22	100.0	0.0
	SA	2	3	19	0.0	100.0
	SA	2	4	12	0.0	0.0
	SA	3	1	25	100.0	100.0
	SA	3	2	21	100.0	0.0
	SA	3	3	9	0.0	100.0
	SA	3	4	5	0.0	0.0

Table 1 (continued)

Census region ^b	Census division ^c	Age group ^d	Composite number	No. of specimens	Percent white	Percent male
S	WS	1	1	13	69.2	53.8
S	WS	2	1	19	78.9	52.6
S	WS	2	2	18	83.3	50.0
S	WS	3	1	23	87.0	43.5
W	MO	1	1	7	85.7	71.4
W	MO	2	1	12	100.0	58.3
W	MO	3	1	10	100.0	70.0
W	PA	1	1	7	85.7	71.4
W	PA	2	1	9	88.9	55.6
W	PA	3	1	15	80.0	46.7

^aData provided by Battelle Columbus Laboratories.^bNC = North Central, NE = Northeastern, S = South, W = West.^cEN = East North Central, WN = West North Central, MA = Middle Atlantic, NE = New England, ES = East South Central, SA = South Atlantic, WS = West South Central, MO = Mountain, PA = Pacific.^dAge group 1 = 0-14 years, age group 2 = 15-44 years, age group 3 = 45+ years.

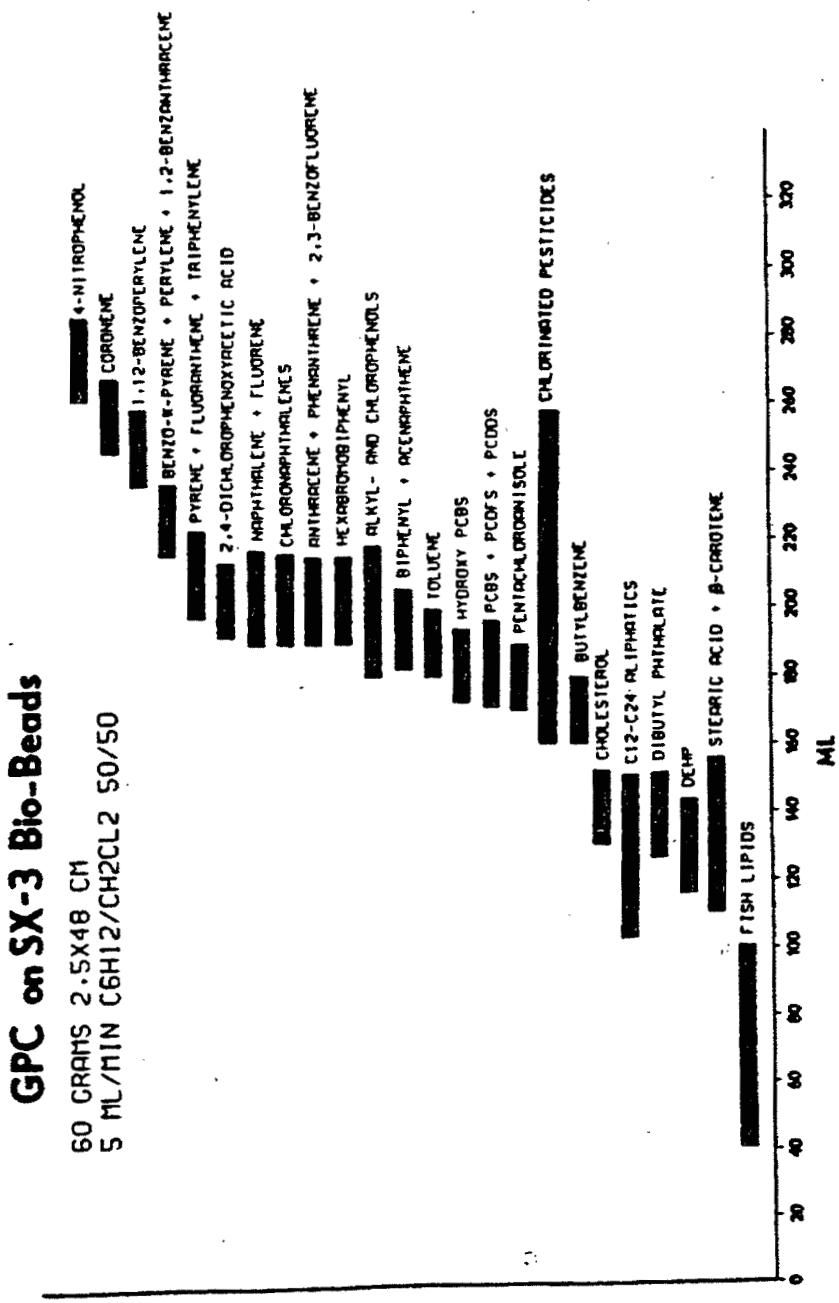


Figure 1. GPC elution profiles of selected biogenic compounds and environmental contaminants (Ribick et al., 1982).

Fractionating of the GPC eluate is necessary to elucidate the most data from a complex sample. The characteristics of Florisil, which has been used extensively for the PGC/ECD method, have been studied for numerous compounds and compound classes (Sherma, Beroza 1980). The GPC bulk lipid cleanup and the Florisil column fraction procedures were selected for the preparation of the NHATS FY82 specimens based on their efficiency and applicability to a large number of compound classes.

b. Target Analytes

A review of the published literature on the analysis of human adipose tissues for environmental contaminants demonstrates that the majority of the monitoring efforts have centered on the organochlorine pesticides and PCBs (Biros, Walker 1970; Yobs 1971; Biros, Enos 1973; Burns 1974; Sovocool, Lewis 1975; Kutz, Yobs, Strassman 1976; Kutz, Sovocool, Strassman, Lewis 1976; Mes, Campbell 1976; Fukano, Doguchi 1977; Kutz, Yobs, Strassman, Viar 1977; Jensen, Clausen 1979; Kutz, Strassman, Sperling 1979; Albert, Mendez, Ipn 1980; Dougherty, Whitaker, Smith, Stalling, Kuehl 1980; Greer, Miller, Bruscato, Hold 1980; Sherma, Beroza 1980; Abbott, Collins, Goudling, Hoodless 1981; Barquet, Morgade, Pfaffenberger 1981; Lopez-Avila, Haile, Goddard et al. 1981; Mes, Davies, Turton 1982; Wolff, Anderson, Selikoff 1982; Wolff, Thornton, Fischbein, Lili, Selikoff 1982; Wolff, Fischbein, Thornton, Rice, Lili, Selikoff 1982; Mori, Kikuta, Okinaga, Okura 1983; Mes, Davies, Turton 1985).

Additional studies have addressed the presence of phthalate esters (Mes, Coffin, Campbell 1974; Mes, Campbell 1976); phosphate triesters (LeBel, Williams 1983); polychlorinated aromatics including chlorophenols, specifically pentachlorophenol (Sovocool, Lewis 1975; Wolff, Thornton, Fischbein, Lili, Selikoff 1982); polychloroterphenyls (Fukano, Doguchi 1977; Wright, Lewis, Crist, Sovocool, Simpson 1978; Watanabe, Yakushiji, Kunita 1980); polybrominated biphenyls (Wolff, Anderson, Camper et al. 1979; Lewis, Sovocool 1982; Wolff, Anderson, Selikoff 1982; Eyster, Kimbrough 1983); and polynuclear aromatic hydrocarbons.

The presence of the PCTs and PBBs has been noted both in specific exposure scenarios and through the GC/MS analysis of pooled NHATS specimen extracts from the previous analysis years (Wright, Lewis, Crist, Sovocool, Simpson 1978; Lewis, Sovocool 1982).

The compound classes identified in human adipose tissue samples were selected as the target analytes for initiating the broad scan analysis concept into the NHATS program.

2. Method Summary

Figure 2 provides a schematic of the method for the broad scan analysis of semivolatile organic compounds. The method requires compositing specified adipose tissue specimens from the NHATS repository. Several stable isotope labeled compounds are added to the tissue as surrogates. The spiked adipose tissue sample is extracted with methylene chloride using a Tekmar® Tissumizer. The extracts are filtered through anhydrous sodium sulfate. Extractable lipid is determined using approximately 1% of the resulting extract.

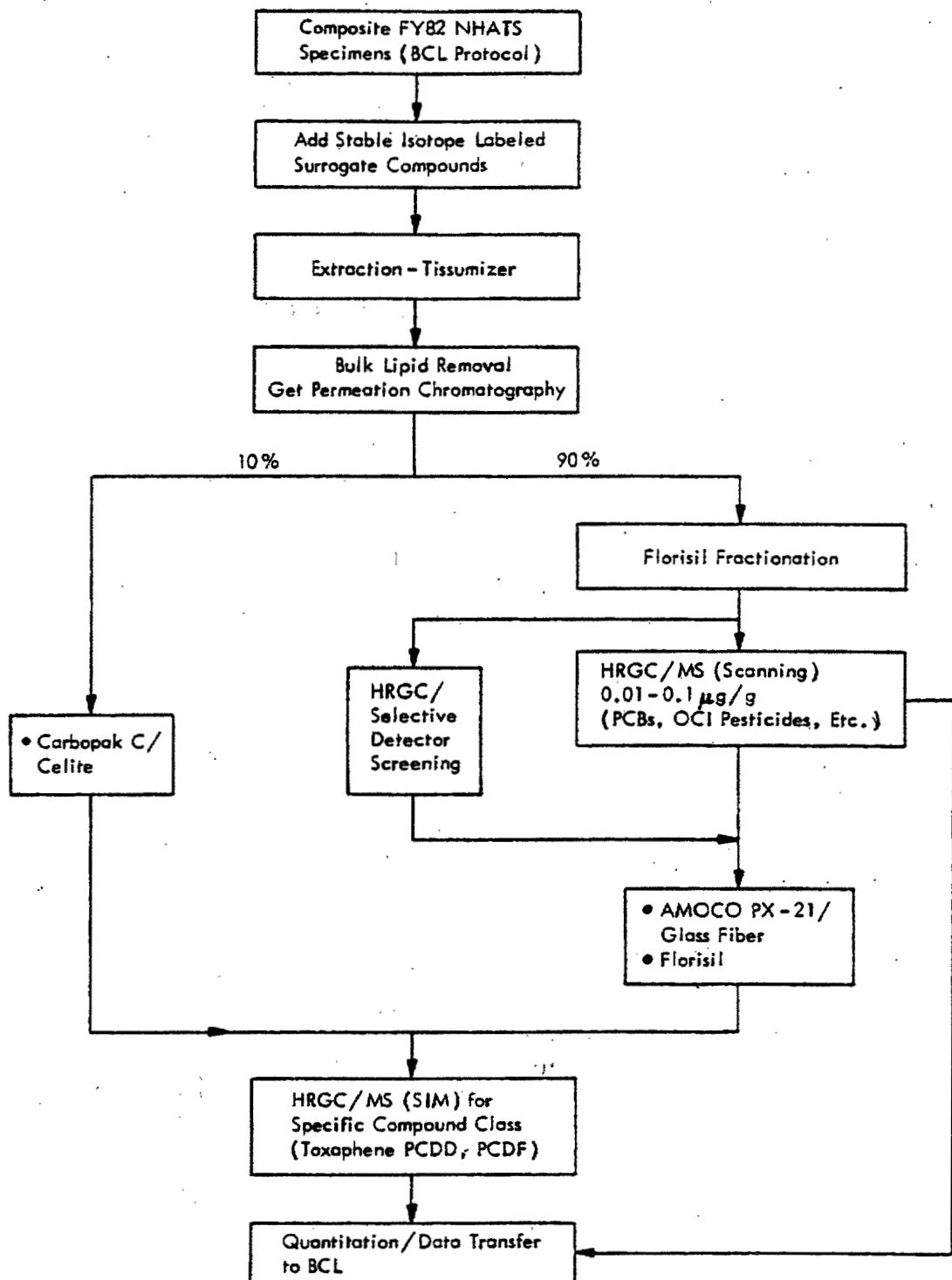


Figure 2. Flow scheme for analysis of semivolatile organic compounds in human adipose tissue.

The extract is concentrated, and the lipid is separated from organic analytes using GPC. The GPC-cleaned extracts are concentrated and then fractionated using Florisil. The Florisil fractions are concentrated, spiked with an internal quantitation standard, and analyzed by HRGC/MS (scanning). The method is applicable to the determination of organochlorine pesticides, PCBs, PBBs, PCTs; polychlorinated diphenyl ethers (PCDEs), chlorobenzenes, PAHs, phthalate esters, and phosphate esters.

3. Reagents and Standards

a. Solvents

Methylene chloride and hexane were obtained as distilled in glass quality (B&J). Diethyl ether was analytical reagent grade, peroxide free. Absolute ethanol was added to the diethyl ether as a preservative/stabilizer. This solution was prepared as 2% absolute ethanol (v/v). The diethyl ether was tested for the presence of peroxides before use. A 1-mL aliquot of a 10% potassium iodide solution was added to 10 mL of the diethyl ether and the mixture was shaken. The presence of peroxides was noted by the development of a yellow color. If no color change was observed, the lot of diethyl ether was used for preparing the Florisil eluents.

b. Chromatographic Materials

The GPC system was prepared from Biobeads SX-3 (Bio-Rad Laboratories). Florisil (60/100 mesh) was extracted with methylene chloride overnight in a Soxhlet apparatus. The extracted material was air dried and then activated at 130°C for at least 24 h prior to use. The Amoco PX-21 charcoal used for preparation of sample extracts for toxaphene analysis was obtained from Dr. L. Smith of the Columbia National Fisheries Research Laboratory, U.S. Fish and Wildlife Service, Columbia, Missouri.

Anhydrous sodium sulfate was extracted 24 h in a Soxhlet apparatus with methylene chloride. The material was allowed to air dry and then was placed in a muffle oven for 2 to 6 h at 650°C. The cleaned material was stored in an oven at 130°C.

c. Analytical Standards

The organochlorine pesticides were obtained from the EPA Reference Materials Branch, Research Triangle Park. Toxaphene was obtained from Supelco as a stock solution. The chlorobenzenes, chlorophenols, PCBs, PBBs, PCTs, PAHs, and phthalate esters were obtained from Ultra Scientific, Hope, Rhode Island. The phosphate triesters were obtained from Chem Service Chemicals, West Chester, Pennsylvania, and Aldrich Chemical Company, Milwaukee, Wisconsin.

d. Surrogate Standards

The surrogate compounds naphthalene-d₈, chrysene-d₁₂, ¹³C₆-1,2,4,5-tetrachlorobenzene, ¹³C₆-hexachlorobenzene, and ¹³C₆-pentachlorophenol were purchased from KOR Isotopes, Cambridge, Massachusetts. The carbon-13

labeled PCBs were prepared from stock materials synthesized under EPA Contract 68-01-5915, Task 51 (Erickson, Stanley, Radolovich 1982). The carbon-13 labeled tetra- and octachlorodibenzo-p-dioxins were obtained from Cambridge isotope laboratories (Woburn, MA).

4. Preparation of Glassware

All glassware was washed with soap and water, and then rinsed sequentially with tap water, distilled water, acetone, and hexane. Both organic solvents were distilled in glass quality (B&J).

5. Extraction, Cleanup, and Concentration

Frozen composited adipose tissue specimens (~ 20 g) were placed in 2.2 x 15 cm culture tubes. Each composited adipose tissue specimen was spiked with several surrogate compounds including naphthalene-d₈ (2 µg); chrysene-d₁₂ (2 µg); ¹³C₆-1,2,4,5-tetrachlorobenzene (2 µg); ¹³C₆-4-chlorobiphenyl, ¹³C₁₂-3,3',4,4'-tetrachlorobiphenyl (4 µg); ¹³C₁₂-2,2',3,3',5,5',6,6'-octachlorobiphenyl (8 µg); ¹³C₁₂-decachlorobiphenyl (10 µg); ¹³C₁₂-2,3,7,8-tetrachlorodibenzo-p-dioxin (1 ng); and ¹³C₁₂-octachlorodibenzo-p-dioxin (5 ng). The spiked adipose tissues were allowed to equilibrate to room temperature and were homogenized for approximately 1 min with a Tekmar® Tissumizer (Tekmar 18-EN probe) with at least five successive aliquots (10 mL) of methylene chloride (B&J, distilled in glass). The methylene chloride extracts were dried by passage through anhydrous sodium sulfate. The sodium sulfate column was rinsed with enough methylene chloride to bring the final extract volume to 100 mL.

6. Lipid Determination

The extractable lipids were determined by removing a 1.0-mL aliquot from the final extract. This aliquot was placed in 2-dram vial preweighed to the nearest 0.0001 g, and solvent was removed using purified nitrogen and a heated water bath. The vial was reweighed to the nearest 0.0001 g, and the lipid content was determined using the weight difference.

7. Gel Permeation Chromatography

The remaining extract was concentrated by Kuderna-Danish evaporation. The final volume was adjusted such that the solution contained approximately 0.3 g of lipid per mL. An ABC Autoprep GPC with an automated sampling valve (23 5-mL sample loops) was used for all bulk lipid separations. GPC columns were prepared with approximately 60 g of Biobeads SX-3 swelled in methylene chloride and packed as a slurry. The GPC was operated using methylene chloride at 5 mL/min under a pressure of 7-15 psi. The GPC columns were calibrated using a solution of vitamin E-acetate which was monitored by a preparative high pressure liquid chromatograph UV detector (Chromatronix Model 230) operated at 254 nm. Collection of the GPC effluent for the semivolatile organic compounds was initiated as the response to the vitamin E-acetate returned to baseline. The GPC columns were also calibrated using varying amounts of lipid material spiked with a solution of the surrogate spiking

solution. Figure 3 is an example of the GPC elution of varying amounts of lipid material versus the surrogate standards. Approximately 0.9-1.0 g of lipid material was added to each sampling loop of the GPC system. The GPC effluents for a single sample were combined and concentrated and taken through the GPC procedure a second time (two to three sample loops as necessary) to remove additional lipid materials. Additional detail in the GPC procedure have been reported previously (Stanley 1985).

8. Florisil Fractionation

Florisil columns (12.5 g, 60/100 mesh, activated at 130°C) were packed in hexane. Anhydrous sodium sulfate was added to the top of each column. The GPC extracts were concentrated and exchanged to hexane (final volume approximately 5 mL). This extract was added to the top of the Florisil column and eluted with 200 mL each of 6%, 15% and 50% diethyl ether in hexane. The 6% fraction was collected separately from the 15% and 50% fractions and was concentrated and solvent exchanged to hexane using Kuderna-Danish evaporation. The 15 and 50% eluates were combined, concentrated, and solvent exchanged to hexane. When the eluents had concentrated to approximately 5 mL, they were further concentrated to 1 mL under a gentle stream of dry nitrogen. The fractions were transferred to 1-mL conical vials and concentrated again to a final volume of 200 µL using flowing prepurified nitrogen. All extracts were stored in a refrigerator until analyzed by HRGC/MS.

9. HRGC/MS Analysis

The semivolatile organic analyses were accomplished with a Finnigan MAT 311A double focusing magnetic sector mass spectrometer. Separation of the semivolatile organic analytes was achieved using a 30 m x 0.25 mm Durabond DB-5 (J&W Scientific, Rancho Cordova, California) fused silica column. The sample extracts were injected through a Grob-style splitless injector. The gas chromatograph was held isothermally at 60°C for 2 min, then programmed at 10°C/min to a final temperature of 310°C. The ion source was operated at 70 eV. A mass range of 80-550 amu was repetitively scanned every 1.7 s. Mass spectra were acquired and stored using a Finnigan-Incos 2300 data system.

As part of the daily quality assurance/quality control (QA/QC) procedures, an analytical standard solution containing compounds representative of the PCBs, PCTs, PBBs, PCDEs, chlorobenzenes, chlorophenols, organochlorine pesticides, phthalate esters, phosphate esters, PAHs, the surrogate compounds, and the internal standard (anthracene-d₁₀) was injected as a calibration standard and a check of the mass assignment. Response factors for individual compounds were calculated relative to the internal standard (anthracene-d₁₀). The relative response factors (RRFs) were calculated as described below.

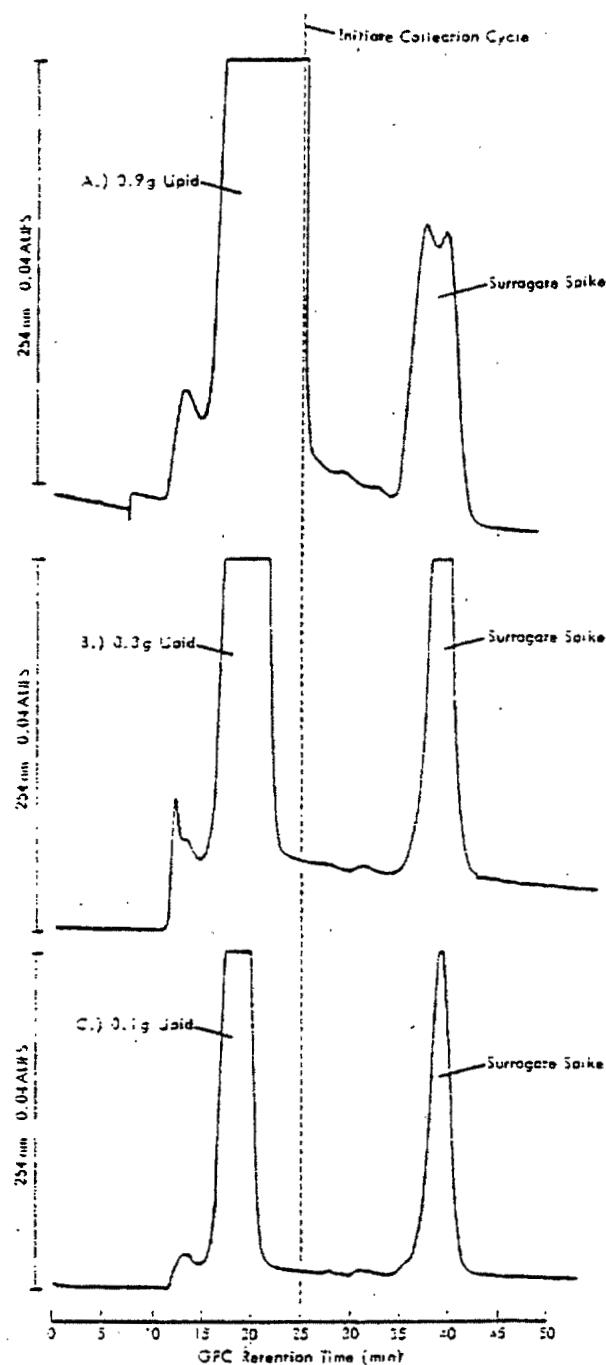


Figure 3. GPC chromatogram of elution of (A) 0.9 g lipid; (B) 0.3 g lipid; and (C) 0.1 g lipid. The GPC column contained 60 g of Biobeads SX-3 and was operated at 5 mL/min with methylene chloride with dump time of 25 min and collection of effluent from 25 to 60 min.

Using injections of 1 to 2 μL of each calibration standard, the observed peak height or area responses of the primary quantitation ion (Table 2) for each target analyte and the internal standard were tabulated. The RRF for each target analyte was determined from the following equation.

$$\text{RRF} = (A_s C_{is}) / (A_{is} C_s)$$

where A_s = area or peak height response for the primary quantitation ion of the target analyte

A_{is} = area or peak height response for the primary quantitation ion of the internal standard, anthracene-d₁₀

C_{is} = concentration of the internal standard ($\text{ng}/\mu\text{L}$)

C_s = concentration of the target analyte ($\text{ng}/\mu\text{L}$)

10. Quality Assurance/Quality Control

The QA/QC procedures included analysis of method blanks, spiked recovery samples, replicate tissue samples, and spiked porcine fat (Adipose 121 prepared by EMSL-LV). These samples were prepared and analyzed with the actual adipose tissue samples. Additional detail on the preparation of these samples is presented in Section V (Quality Assurance/Quality Control). Instrumental QA/QC activities included daily instrument calibration, analysis of at least one calibration standard to demonstrate sensitivity, consistency of response factors, and verification of mass assignments. The area of the internal standard d₁₀-anthracene was recorded on a per sample basis as a means of determining fluctuations in instrument sensitivity.

Other QA/QC procedures included daily verification of the GPC column calibration. This was achieved using the vitamin E-acetate solution described in the GPC procedure. The GPC collection cycle for the chlorobenzenes, PCBs and PAH compounds was also verified by injecting an aliquot of the surrogate spiking solution monitoring the response to the UV detector over the collection cycle (Figure 3).

11. Data Interpretation

The HRGC/MS data for each sample were interpreted with computer-assisted quantitation routines. A mass spectral library and quantitation list of the target analytes based on relative retention times and the primary characteristic ion were used to search each data file.

a. Qualitative Identification

The automated search and quantitation routine identified positive responses based on the primary characteristic ion for each of the target analytes. Table 2 provides a list of target analytes, surrogates, the primary quantitation ions, and secondary ions used for compound characterization. In addition to the automated search, the MS analyst identified compounds by reviewing the total mass spectra at the specified HRGC/MS scan number. This effort was required to avoid the inclusion of false positives in the sample set.

Table 2. Characteristic Masses and Intensities for the Qualitative Identification of the Semivolatile Target Analytes and Chromatographic Conditions

Compound	Characteristic masses (m/z)			Relative Retention time ^a
	Primary	Secondary	Secondary	
<u>Organochlorine Pesticides</u>				
P,P'-DDT	235 (100) ^b	237 (72)	165 (48)	1.33-1.39
O,P'-DDT	235 (100)	237 (66)	165 (59)	1.29-1.35
P,O'-DDE	246 (100)	248 (58)	176 (41)	1.23-1.29
O,P'-DDE	246 (100)	248 (64)	176 (38)	1.19-1.25
P,P'-DDD	235 (100)	237 (66)	165 (58)	1.28-1.34
O,P'-DDD	235 (100)	237 (66)	165 (58)	1.24-1.30
α -BHC	183 (100)	181 (96)	219 (68)	0.90-0.96
B-BHC	183 (100)	181 (96)	219 (81)	0.95-1.00
δ -BHC	183 (100)	181 (96)	219 (81)	0.99-1.05
Aldrin	263 (100)	265 (67)	261 (63)	1.09-1.15
Dieldrin	263 (100)	265 (58)	279 (58)	1.23-1.29
Endrin	263 (100)	265 (66)	279 (38)	1.26-1.44
Heptachlor	100 (100)	272 (35)	274 (30)	1.08-1.14
Heptachlor epoxide	353 (100)	355 (83)	351 (56)	1.16-1.21
Mirex	272 (100)	274 (82)	270 (51)	1.46-1.52
trans-Nonachlor	409 (100)	407 (91)	411 (65)	1.21-1.27
γ -Chlordane	373 (100)	375 (99)	377 (50)	1.19-1.24
<u>Polychlorinated Biphenyls (PCBs)</u>				
Monochloro- (3 isomers)	188 (100)	190 (33)	-	0.63-0.86
Dichloro- (12 isomers)	222 (100)	224 (66)	226 (11)	0.81-0.95
Trichloro- (24 isomers)	256 (100)	258 (99)	260 (33)	0.81-1.10
Tetrachloro- (42 isomers)	292 (100)	290 (76)	294 (49)	0.90-1.30
Pentachloro- (46 isomers)	326 (100)	328 (66)	324 (61)	1.05-1.40
Hexachloro- (42 isomers)	360 (100)	362 (82)	358 (51)	1.25-1.49
Heptachloro- (24 isomers)	394 (100)	395 (98)	392 (44)	1.30-1.61
Octachloro- (12 isomers)	430 (100)	428 (87)	432 (66)	1.40-1.55
Nonachloro- (3 isomers)	464 (100)	462 (76)	466 (76)	1.49-1.61
Decachloro- (1 isomer)	498 (100)	500 (87)	496 (68)	1.61-1.67

Table 2 (continued)

Compound	Characteristic masses (m/z)			Relative Retention time ^a
	Primary	Secondary	Secondary	
<u>Chlorobenzenes</u>				
Trichloro- (3 isomers)	180 (100)	182 (98)	184 (32)	0.36-0.60
Tetrachloro- (3 isomers)	216 (100)	214 (77)	218 (49)	0.55-0.80
Pentachloro-	250 (100)	252 (65)	248 (61)	0.76-0.82
Hexachloro-	284 (100)	286 (82)	282 (51)	0.91-1.00
<u>Phthalate Esters</u>				
Dimethyl phthalate	163 (100)	194 (11)	164 (10)	0.70-0.76
Diethyl phthalate	149 (100)	177 (31)	150 (12)	0.82-0.87
Di-n-butyl phthalate	149 (100)	150 (19)	104 (9)	1.08-1.14
Butyl benzyl phthalate	149 (100)	167 (38)	279 (-)	1.33-1.38
Di-n-octyl phthalate	149 (100)	167 (41)	-	1.43-1.48
<u>Phosphate Triesters</u>				
Tributyl phosphate	99 (100)	155 (27)	211 (16)	0.86-0.92
tris(2-Chloroethyl) phosphate	143 (100)	249 (95)	251 (60)	0.95-1.00
tris(Dichloropropyl) phosphate	99 (100)	191 (65)	209 (45)	1.32-1.38
Tributoxyethyl phosphate	101 (100)	325 (99)	170 (32)	1.36-1.43
Tritolyl phosphate	91 (100)	165 (80)	368 (77)	1.46-1.57
<u>Polynuclear Aromatic Hydrocarbons (PAHs)</u>				
Naphthalene	128 (100)	129 (12)	127 (11)	0.46-0.52
Acenaphthylene	152 (100)	151 (17)	153 (16)	0.70-0.76
Acenaphthene	154 (100)	153 (86)	152 (43)	0.73-0.79
Fluorene	166 (100)	165 (83)	167 (14)	0.81-0.87
Phenanthrene	178 (100)	179 (16)	176 (18)	0.97-1.02
Fluoranthene	202 (100)	101 (23)	100 (14)	1.16-1.22
Pyrene	202 (100)	101 (26)	100 (17)	1.20-1.25
Chrysene	228 (100)	226 (22)	229 (22)	1.40-1.46

Table 2 (continued)

Compound	Characteristic masses (m/z)			Relative Retention time ^a
	Primary	Secondary	Secondary	
<u>Surrogate Compounds</u>				
Naphthalene-d ₈	136 (100)	137 (12)	135 (11)	0.46-0.52
Chrysene-d ₁₂	240 (100)	238 (22)	241 (22)	1.40-1.46
¹³ C ₆ -1,2,4,5-Tetrachlorobenzene	222 (100)	220 (77)	224 (49)	0.55-0.80
¹³ C ₆ -Hexachlorobenzene	292 (100)	294 (82)	288 (51)	0.91-1.00
¹³ C ₁₂ -3',3"-4,4"-Tetrachlorobiphenyl	304 (100)	302 (76)	306 (49)	0.90-1.30
¹³ C ₁₂ -2',2",3,3',4,4',5,5"-Octachlorobiphenyl	442 (100)	440 (87)	444 (66)	1.40-1.55
¹³ C ₁₂ -Decachlorobiphenyl	510 (100)	512 (87)	508 (68)	1.61-1.67
<u>Internal Standard</u>				
Anthracene-d ₁₀	188 (100)	186 (18)	189 (16)	1.00

^aRelative retention times calculated versus the internal standard anthracene-d₁₀.^bValue in parentheses reflects ratio of response in percent to the primary quantitation ion.

b. Quantitation

Data were quantitated on the internal standard method. Table 2 presents the primary quantitation ions for each of the target analytes, surrogates, and the internal standard.

The HRGC/MS data were quantitated using the following equation:

$$\text{Target Analyte, } \mu\text{g} = \frac{A_S \times IS}{A_{IS} \times RRF}$$

where A_S = area of the primary quantitation ion of the target analyte,
 A_{IS} = area of the primary quantitation ion (m/z 188) of the internal standard, anthracene-d₁₀
IS = concentration of the internal standard in micrograms (μg), and
RRF = relative response factor of the target analyte versus the internal standard.

The concentration (C_{WT}) of the target analyte in the original wet tissue sample was calculated by dividing the total micrograms of target analyte detected by the total composite weight. In this report concentration data are expressed as micrograms per gram ($\mu\text{g/g}$). The concentration data (C_{LW}) on a lipid basis were calculated by dividing the wet tissue concentration (C_{WT}) by the measured percent lipid value.

The quantitative data were qualified based on the observed response for each target analyte and the corresponding internal standard. Compounds for which no positive response was observed are reported as not detected (ND). Limit of detection (LOD) and limit of quantitation (LOQ) were estimated based on the observed instrumental response for the specific target analyte from the low level concentration standard from preliminary calibration procedures.

Compounds detected for which the observed response of the characteristic quantitation ion was greater than 2.5 times but less than 10 times the background signal-to-noise are reported as trace (tr) values. Target analytes detected at greater than 10 times the background signal-to-noise are reported as greater than the limit of quantitation (LOQ).

All data were corrected for blank values observed for the system blank run with each set of samples.

12. HRGC/Selective Detector Screening

The HRGC/MS extracts from the composited tissue samples were also analyzed by HRGC/electron capture detector (HRGC/ECD) as a means to screen for response to additional compounds. The sample extracts were diluted 1 to 10 (10 μL of extract to 100 μL final volume in hexane). The HRGC/ECD analysis was achieved using a 30 m x 0.25 mm DB-5 fused silica column. The analysis conditions (injector operation and temperature program) were identical to the parameters specified for the HRGC/MS analysis.

C. Toxaphene Analysis

Following the broad scan HRGC/MS analysis, selected sample extracts from the 45+ age category were taken through additional cleanup for analysis by HRGC/MS selected ion monitoring (SIM) techniques. The cleanup procedure required elution through a carbon adsorbent column followed by fractionation on a deactivated Florisil column.

1. Carbon Adsorbent Chromatography

The carbon based cleanup described below is a modification of a procedure for the isolation of polychlorinated aromatics from biological samples (Smith, Stalling, Johnson 1984).

a. Preparation of the Carbon/Glass Fiber Adsorbent

Whatman GF/D fiber filters (600 mg) were cut into small pieces, suspended in approximately 70 mL methylene chloride and shredded with a Tekmar® Tissumizer. Amoco PX-21 carbon (50 mg) provided by Dr. L. Smith, U.S. Fish and Wildlife, Columbia, Missouri, was added to this mixture, and the grinding was continued until the carbon was uniformly distributed on the fibers. This mixture yielded the packing required for a single adsorbent column.

b. Preparation of the Adsorbent Column

Thick-walled, 1.0 cm i.d. precision bore glass tubes (6-cm lengths) were custom fit with TFE plugs. These plugs were bored to accommodate 1/16 in. o.d. stainless steel tubing. This stainless steel tubing was used to connect the columns to the solvent reservoir. Both ends of the column were equipped with this stainless steel tubing to allow disconnection of the column and inversion to change the direction of the solvent flow. To pack the column, one end was fitted with a TFE plug. Four discs of glass fiber filters (Whatman GF/D 1.0 cm diameter) were placed flush against the TFE plug. The carbon/glass fiber mixture consisting of 600 mg glass fibers and 50 mg carbon was added to the column in methylene chloride. A glass rod was used to pack the mixture. After this mixture had been added to the column, four discs of Whatman GF/D 1.0 cm diameter glass fiber filters were gently packed on top of the carbon/glass fiber adsorbent. The second TFE plug was pushed into place, compressing the adsorbent. The column bed height measured 3-4 cm. It is important that the carbon adsorbent is contained between the glass fiber discs. Once prepared, the column can be reused indefinitely when cleaned properly between samples.

c. Column Cleanup

Prior to sample cleanup, the column was washed with 100 mL of toluene, followed by 100 mL methanol, and then 100 mL toluene again. The residual toluene was displaced with 150 mL cyclohexane/methylene chloride (50/50). After this solvent had eluted through the column in reverse flow, the column was inverted for forward flow. Immediately before sample application, an additional 50 mL of the 50/50 solvent was eluted through the column with nitrogen pressure to remove any air pockets. In order to maintain a flow of 3-5 mL/min, a slight nitrogen pressure was necessary.

d. Cleanup of Composite Sample Extracts

Following the broad scan HRGC/MS analysis, the 6% and 15/50% diethyl ether/hexane extracts for the selected composites were combined and diluted with 5 mL of the cyclohexane/methylene chloride (50/50) solvent. This sample was added to the column reservoir and allowed to drain onto the column. The sample vial and column reservoir were rinsed with two 5-mL portions of the cyclohexane/methylene chloride (50/50) solvent. The flow rate was adjusted to 3-5 mL/min. After the last rinse, 75 mL of the (50/50) cyclohexane/methylene chloride solvent was added to the reservoir. This was followed by 50 mL of methylene chloride/methanol/benzene (75/20/5). The flow of the column was then reversed by inversion of the column. The reservoir was filled with 40 mL toluene. This fraction was collected from the column at a rate no greater than 3-4 mL/min. A positive pressure on the system with nitrogen was necessary to achieve this flow rate.

Each solvent that eluted through the carbon/glass fiber adsorbent was collected separately. The method evaluation studies described later in this section demonstrated that toxaphene was eluted with the cyclohexane/methylene chloride (50/50). The toluene fraction collected in the reverse elution sequence was reserved for analysis of polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs). The methylene chloride/methanol/benzene fraction was collected but was not targeted for specified compound analysis.

2. Florisil Column Fractionation

Additional fractionation of the sample extract was necessary to avoid interference problems that might arise from the presence of PCBs co-eluted in the methylene chloride/cyclohexane fraction (50/50) from the carbon adsorbent column. The Florisil fractionation procedure described below has been previously reported for the separation of toxaphene from PCBs in biological samples (Zell, Ballschmiter 1980).

a. Florisil Preparation

The Florisil was precleaned by methylene chloride extraction for 13 h followed by oven activation at 130°C. For optimum separation the Florisil was deactivated with 1.25% water. A portion of the Florisil was removed from the oven and cooled to room temperature. The Florisil was weighed, and the required amount of doubly distilled water was added. The Florisil/water mixture was then tumbled on a mechanical roller allowing at least 3 h for equilibration.

b. Preparation of the Chromatography Column

The column (260 mm x 17 mm) equipped with a TFE stopcock and a 250-mL solvent reservoir was packed with a small plug of glass wool and 13.0 g (± 0.1 g) Florisil (deactivated with 1.25% water) as a slurry in hexane. Additional hexane was added to the reservoir and allowed to drain through the Florisil. Slight tapping of the column helped to settle the Florisil and eliminate air channels. When the hexane was within 1/4 in. of the Florisil, the stopcock was closed.

c. Elution Procedure

Ten milliliters of the methylene chloride/cyclohexane fraction from the charcoal adsorbent column was exchanged to 1-mL hexane for application to the Florisil column. The sample extract was transferred to the top of the column directly onto the hexane. The extract was allowed to drain onto the column. The sample vial was rinsed with two 2.5-mL portions hexane which were each applied to the column separately and allowed to drain within 1/4 in. of the Florisil. The column was eluted with 55 mL of hexane followed by 50 mL of 10% diethyl ether in hexane. The 10% diethyl ether fraction was concentrated to less than 0.5 mL under a gentle stream of flowing prepurified nitrogen and transferred. The final volume was transferred to 1.0 mL conical vials. The extract was reduced just to dryness and reconstituted to 20 μ L of isoctane prior to HRGC/MS analysis.

3. HRGC/MS-SIM Analysis

Analysis of the sample extract was achieved using a Kratos MS50TC double focusing magnetic sector mass spectrometer operated in the SIM mode. The characteristic ions for toxaphene were determined from the full scan analysis of a 90 ng/ μ L toxaphene standard. The results section of this report demonstrates that the electron impact ionization of toxaphene results in complex fragmentation pattern with no major ion of significant intensity. As a result of the full scan analysis, nine ions (m/z 231, 233, 235, 269, 271, 273, 305, 307, 309) characteristic of toxaphene were used to monitor the response from the extracts of 14 selected samples. A second HRGC/MS-SIM analysis of three of the extracts using ions at m/z 305, 307, 309, 327, 329, 331, 341, 343 and 345 provided additional information on the presence of toxaphene. Although higher masses were noted in the mass spectra from full scan analyses of toxaphene, the response intensity was minimal. Hence, ions at masses higher than m/z 345 were not included in the analysis scheme.

D. Method Validation

1. Broad Scan HRGC/MS Analysis

Two analytical procedures were initially evaluated for the analysis of a wide range of organic compounds including organochlorine pesticides, chlorobenzenes, PCBs, PBBs, PCTs, PCDEs, PAHs, PCDDs, PCDFs, phthalates, and organophosphorous esters. Analytes representing the nine compound classes were spiked at concentrations equivalent to 0.10 μ g/g into six replicate lipid samples of approximately 15 g each. The lipid used for the spiking procedures was obtained from approximately 120 g of human adipose tissue. This adipose tissue was extracted using methylene chloride and a Tekmar® Tissumizer. The resulting extract was chromatographed with an ABC gel permeation chromatography system using Biobeads SX-3 and methylene chloride following the conditions previously identified. The lipid material eluting from the column was collected separately from the specific xenobiotic analytes collected from this material.

One procedure required the use of approximately 200 g of Micro Cell E (Johns Manville Corporation), a commercial calcium silicate adsorbent, to remove bulk lipid material (Rogers 1972). The spiked lipid material was adsorbed on the Micro Cell E (MCE), and the adsorbent was then extracted with 5% acetone/acetonitrile. The resulting extract contained 2 to 3 g of lipid material, which required at most three passes through the GPC system. This provided a distinct saving in the total time required for bulk lipid removal for large samples.

The other procedure relied on elution of the entire lipid extract through the GPC system as previously described. A minimum of 15 injections were required for each of the spiked 15 g of lipid material. Fractionation of the extracts from both bulk lipid removal procedures required Florisil activated at 130°C and eluted with solvents of 6%, 15%, and 50% diethyl ether/hexane.

The extracts were analyzed using either a 15-m or 30-m J&W DB-5 HRGC column and the Finnigan MAT 311A double focusing mass spectrometer. A mass range of 90-600 atomic mass units (amu) was scanned for the analysis of the extracts. Both direct on-column and Grob type split/splitless injection systems were investigated for extract analysis.

The results of the method evaluation experiments are presented in Table 3. The data represent the average recovery of the range of analytes for triplicate analyses of spiked lipid using each procedure. Although the method using Micro Cell E provided a distinct advantage in sample turnaround time, the recoveries of the analytes were considerably less (approximately 50%) than recoveries achieved using only GPC for removal of bulk lipid.

Most of the analytes were eluted from the Florisil column in the 6% diethyl ether/hexane fraction. The results of the method evaluation studies indicated that the organochlorine pesticides (with the exception of dieldrin), chlorobenzenes, PCBs, PBBs, PCTs, lower molecular weight PAHs and tetra- and pentachloro-dioxins were eluted in the 6% diethyl ether hexane fraction from the Florisil. Phthalates, phosphate esters, dieldrin, chlorophenols, higher molecular weight PAHs, and hexa- and heptachlorodibenzo-p-dioxins were identified in the 15 and 50% diethyl ether hexane Florisil fractions. Some compounds, including octa-dioxins and furans and some phosphate esters, were not effectively recovered from Florisil.

An important aspect for the analysis of the sample extracts was determined to be the selection of the injection technique for HRGC/MS. The on-column injection technique required that the extract contain little or no lipid material. On column injection of an extract containing lipid material led to considerable broadening of peaks and poor chromatography. This in turn affected the detection limit for the various compounds. The Grob style injector, however, provided much better chromatography and was determined to be the technique of choice for the analysis of the composite samples.

Table 3. Summary of Average Recoveries of Specific Analytes from Triplicate Analyses of Spiked Lipid (Human Adipose) Samples

Analyte	GPC/Florisil average recovery (%)	MCE/GPC/Florisil average recovery (%)
Chlorobenzene	23	5
1,2-Dichlorobenzene	42	24 ^b
2,4-Dichlorophenol	52 ^a	ND
1,2,4-Trichlorobenzene	62	30
Naphthalene	65	35
2,4,6-Trichlorophenol	63 ^a	ND
Acenaphthylene	56	26
Dimethyl phthalate	61 ^a	4
Acenaphthene	74	40
Pentachlorobenzene	66	36
¹³ C-Monochlorobiphenyl	73	42
Fluorene	72	45
Diethyl phthalate	140	150
4-Chlorodiphenyl ether	77	40
4-Bromobiphenyl	81	56
α -BHC	97	74
Hexachlorobenzene	80	36
tris(2-Chloroethyl)phosphate	ND	ND
β -BHC	101 ^c	82
Phenanthrene	91	60
Δ -BHC	108 ^c	44
Heptachlor	87	45
Di-n-butyl phthalate	120	125 ^a
Pentachlorophenol	106 ^c	44
Aldrin	102	54
4,4'-Dibromobiphenyl	86	44
2,4,6-Tribromobiphenyl	126	56
Heptachlor epoxide	92	52
Fluoranthene	99	58
o,p' -DDE	102	64
Pyrene	87	55
Chrysene	98	65
trans-Nonachlor	98	57
p,p' -DDE	120	69

Table 3 (continued)

Analyte	GPC/Florisil average recovery (%)	MCE/GPC/Florisil average recovery (%)
Dieldrin	98 ^c	64
¹³ C ₁₂ -Tetrachlorobiphenyl	77	43 ^a
<u>o,p'</u> -DDD	84	52
<u>p,p'</u> -DDD	110	61
2,2',4,4',5-Pentachlorodiphenyl ether	96	54
tris(Dichloropropyl)phosphate	48	13
2,3,7,8-Tetrachlorodibenzofuran	81	32
Butyl benzyl phthalate	130	78 ^a
2,2',4',5-Tetrabromobiphenyl	100	50
<u>p,p'</u> -DDT	84	55
1,2,3,4-Tetrachlorodibenzo-p-dioxin	80	39 ^a
Tributoxyethyl phosphate	160 ^a	113
4-Chloro-p-terphenyl	110 ^a	53
2,5-Dichloroterphenyl	100 ^a	61
1,2-Benzanthracene	140	46
¹³ C ₁₂ -Octachlorobiphenyl	80	38
2,5-Dichloro-m-terphenyl	110 ^a	58
2,2',4,5',6-Pentabromobiphenyl	85 ^a	53
1,2,3,7,8-Pentachloro-p-dioxin	79 ^a	37 ^a
Mirex	110 ^a	49
2,2',4,4',6,6'-Hexabromobiphenyl	63 ^a	ND
2,4',5-Trichloro-o-terphenyl	120	51 ^a
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	78 ^a	29 ^a
Benzo-k-fluoranthene	85	56 ^a
2,4,4',6-Tetrachloro-o-terphenyl	140 ^a	56
¹³ C-Decachlorobiphenyl	110 ^a	26
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	62	11
Decachlorodiphenyl ether	120	37
Octachlorodibenzo-p-dioxin	ND	57 ^c
Octachlorodibenzofuran	ND ^b	114 ^c
1,2,5,6-Dibenzanthracene	91 ^a	37
Benzo-g,h,i-perylene	51 ^a	32

^aTwo determinations.^bND = not detected.^cOne determination.

2. Toxaphene Analysis

Method evaluation of the toxaphene separation schemes was limited to the analysis of spiked blanks for both the carbon and Florisil column cleanup. As described earlier, the sample extracts were chromatographed first on the Amoco PX-21 charcoal glass fiber column and then the Florisil column. The charcoal column was included in the cleanup primarily as a means of isolating PCDDs and PCDFs as part of a separate task under the broad scan analysis work assignment. The inclusion of the carbon based cleanup system did provide the opportunity to isolate the toxaphene from other potentially interfering analytes.

Recovery of toxaphene from the carbon based column was first investigated to determine which eluate should be taken through further fractionation on the Florisil column. Approximately 5 µg of toxaphene was spiked onto a carbon column, and the column was eluted as described earlier. The three fractions of cyclohexane/methylene chloride (50/50); methylene chloride/methanol/benzene (75/20/5); and toluene were collected separately and screened for toxaphene recovery by HRGC/ECD. Recovery calculations were based on summation of areas for the toxaphene response in a retention time window established from the analysis of the toxaphene standard. Recoveries were calculated by direct comparison to a toxaphene standard and two internal standards (1,2-dichloronaphthalene and octachloronaphthalene). The results of these recovery calculations are summarized in Table 4.

As noted in Table 4, the recoveries from the three different quantitation procedures indicate that toxaphene was recovered at approximately 80% in the first eluate from the carbon column. Based on these results, the methylene chloride/cyclohexane fraction of the carbon column cleanups for the composite extracts from the 45+ age category were reserved for further cleanup on Florisil.

The recovery of toxaphene from the Florisil column procedure was also investigated. Table 5 summarizes the recovery of toxaphene from this cleanup procedure using 1.0 and 0.1 µg spike levels. These results demonstrate that the toxaphene is recovered from 80 to 100% in the 10% acetone in the hexane fraction. The data presented in Table 5 also demonstrates that the Florisil column fractionation does provide separation of equal spike levels of toxaphene and Aroclor 1260. Figures 4 and 5 are examples of the separation of the mixture of PCBs and toxaphene achieved using packed column (1.5% SP-2250, 1.95% SP-2240 on 100/120 Supelcopor) GC/ECD.

IV. RESULTS

A. Broad Scan Analysis

1. HRGC/MS

The HRGC/MS analyses for the 46 composite samples and the associated QC samples (blanks, replicates, and spikes) were completed following the method evaluation studies. Figures 6 to 9 illustrate the incidence of detection of specific target analytes or compound classes that were determined using the automated HRGC/MS search and quantitation routines based on the mass spectral library established in the method evaluation studies.

Table 4. Recoveries of Toxaphene from Carbon/Glass Fiber Adsorbent Column

Fraction	Direct comparison to toxaphene standard	Relative to 1,2-dichloro-naphthalene (IS) ^a	Relative to octachloro-naphthalene (IS)
Methylene chloride/cyclohexane (50/50)	79.6	79.9	87.5
Methylene chloride/cyclohexane/benzene (75/20/5)	1.4	1.4	1.4
Toluene	1.8	2.1	NC ^b

^aIS = internal standard.

^bNC = not calculated.

Table 5. Recovery of Toxaphene from Florisil Cleanup

Amount of spike	Fraction	Recovery	% Recovery of spike
1 µg toxaphene	50 mL hexane	0.13 µg	13
	50 mL 90/10 ^a	0.81 µg	81
100 ng toxaphene	50 mL hexane	23 ng	23
	50 mL 90/10	90 ng	90
1 µg toxaphene + 1 µg Aroclor 1260	50 mL hexane	1.2 µg (A) ^b	120 (A)
	50 mL 90/10	1.0 µg (T)	100 (T)

^a90% hexane, 10% acetone.^b(A) = Aroclor standard recovery; (T) = toxaphene standard recovery.

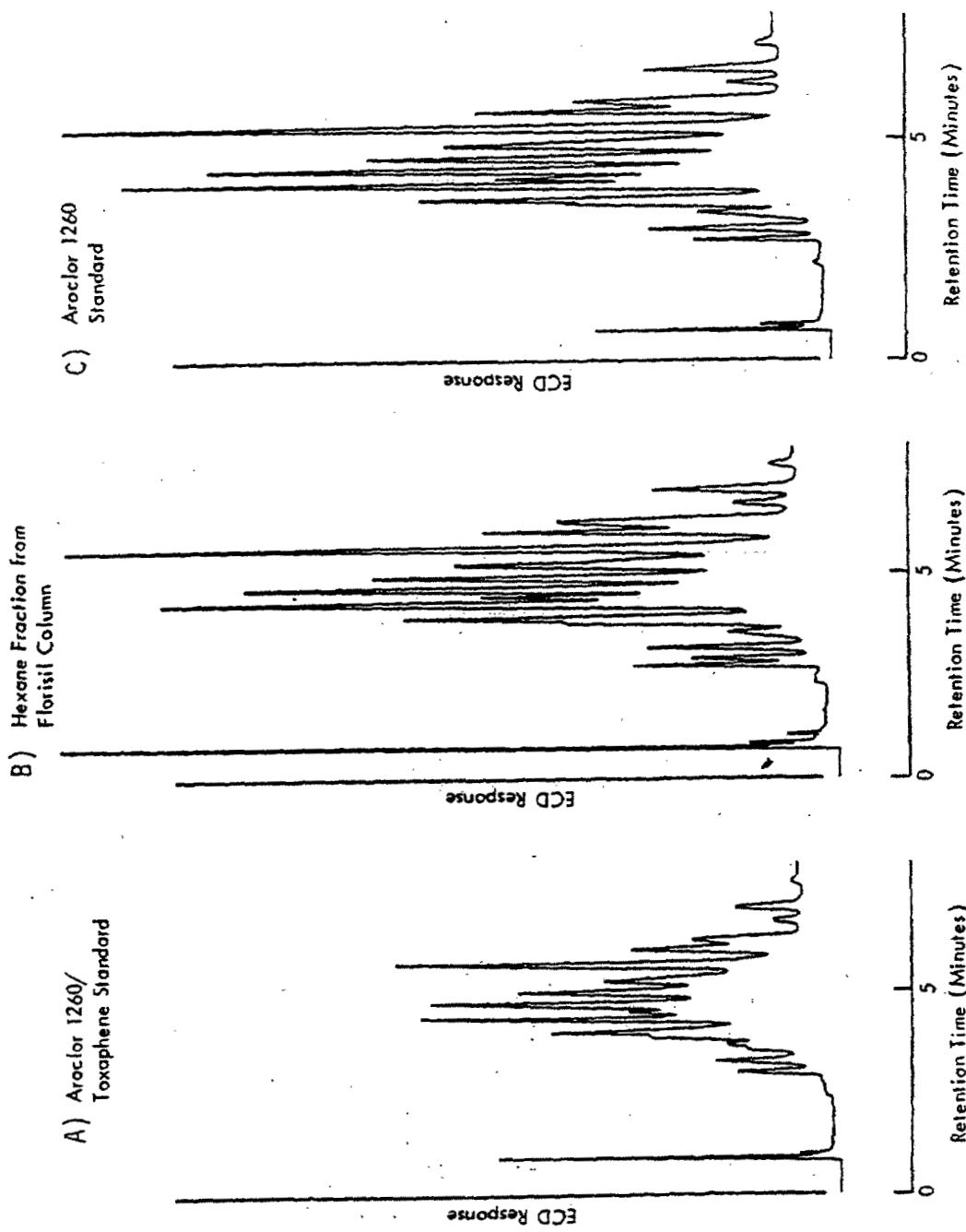


Figure 4. Separation of PCBs from toxaphene using Florisil (1.25% deactivated) fractionation. A) Aroclor 1260/toxaphene mixed standard; B) hexane fraction from Florisil; C) Aroclor 1260 standard.

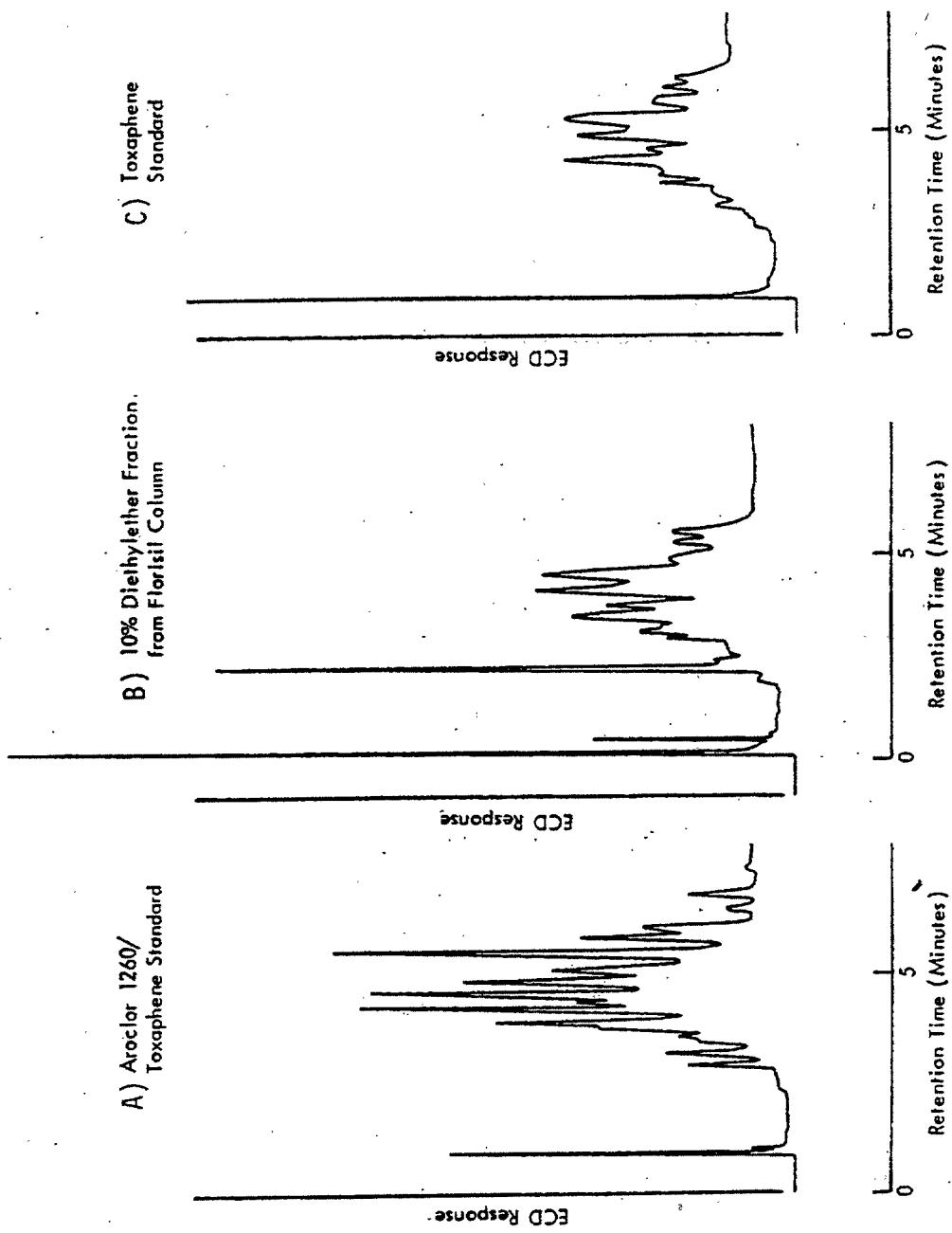


Figure 5. Separation of toxaphene from PCBs using Florisil (1.25% deactivated) fractionation. A) Aroclor 1260/toxaphene mixed standard; B) 10% diethyl ether in hexane fraction from Florisil; C) toxaphene standard.

Census region Census division	West					
	Mountain			Pacific		
	0-14	15-44	45+	0-14	45+	
Compound						
1,2-Dichlorobenzene	-	-	-	-	-	-
1,2,4-Trichlorobenzene	-	-	-	-	-	-
Naphthalene	-	-	-	-	-	+
Pentachlorobenzene	-	-	-	-	-	-
Diethyl phthalate	-	-	+	-	-	-
Tributyl phosphate	-	-	-	-	-	-
Hexachlorobenzene	-	+	+	+	-	+
β -BHC	-	+	+	+	-	-
Phenanthrene	-	-	-	-	-	-
Di-n-butyl phthalate	-	-	-	-	-	-
Heptachlor epoxide	-	-	+	-	-	-
Pyrene	-	-	-	-	-	-
trans-Nonachlor	-	-	+	-	-	-
p,p'-DDE	+	+	+	+	-	-
Dieldrin	-	-	-	-	-	-
p,p'-DDT	+	+	+	+	-	-
Butylbenzyl phthalate	-	+	+	-	-	+
Triphenyl phosphate	-	+	+	-	-	+
Di-n-octyl phthalate	-	-	-	-	-	+
Mirex	-	-	-	-	-	-
tris(2-Chloroethyl) phosphate	-	-	-	-	-	-
Total PCBs	-	+	+	-	-	+
Trichlorobiphenyl	-	-	-	-	-	-
Tetrachlorobiphenyl	-	-	+	-	-	-
Pentachlorobiphenyl	-	-	+	-	-	+
Hexachlorobiphenyl	-	+	+	-	-	+
Heptachlorobiphenyl	-	-	+	-	-	+
Octachlorobiphenyl	-	-	-	-	-	+
Nonachlorobiphenyl	-	-	-	-	-	+
Decachlorobiphenyl	-	-	-	-	-	-

Figure 6. Incidence of detection of semivolatile organic compounds determined in composited human adipose tissue from the West Census Region. A positive (+) value indicates the compound was detected at a trace or positive quantifiable level. A negative (-) value indicates the compound was not detected. The number of symbols for each age group indicates the number of composites analyzed.

Census region	Census division	Northeast					
		New England			Middle Atlantic		
Compound		0-14	15-44	45+	0-14	15-44	45+
1,2-Dichlorobenzene		-	-	+	--	--	-+
1,2,4-Trichlorobenzene		-	-	-	--	--	--
Naphthalene		-	+	-	--	-+	-+
Pentachlorobenzene		-	-	-	--	--	--
Diethyl phthalate		+	+	+	-+	-+	--
Tributyl phosphate		-	-	-	--	--	--
Hexachlorobenzene		-	+	+	++	++	+-
β -BHC		-	+	+	++	++	++
Phenanthrene		-	-	-	--	-+	--
Di-n-butyl phthalate		-	-	+	-+	++	++
Heptachlor epoxide		-	+	-	++	++	+-
Pyrene		-	-	-	--	--	--
trans-Nonachlor		-	+	-	++	++	+-
p,p'-DDE		+	+	+	++	++	++
Dieldrin		-	-	-	--	--	-+
p,p'-DDT		-	+	+	++	-+	-+
Butylbenzyl phthalate		-	-	-	-+	++	-+
Triphenyl phosphate		-	-	-	-+	-+	-+
Di-n-octyl phthalate		+	+	-	--	-+	-+
Mirex		-	+	+	--	--	--
tris(2-Chloroethyl) phosphate		-	-	-	--	--	--
Total PCBs		-	+	+	++	++	++
Trichlorobiphenyl		-	-	-	--	--	--
Tetrachlorobiphenyl		-	+	+	++	++	++
Pentachlorobiphenyl		-	+	+	++	++	++
Hexachlorobiphenyl		-	+	-	++	++	++
Heptachlorobiphenyl		-	-	-	--	-+	-
Octachlorobiphenyl		-	-	+	--	--	--
Nonachlorobiphenyl		-	-	-	--	--	--
Decachlorobiphenyl		-	-	-	--	--	--

Figure 7. Incidence of detection of semivolatile organic compounds determined in composited human adipose tissue from the Northeast Census Region. A positive (+) value indicates the compound was detected at a trace or positive quantifiable level. A negative (-) value indicates the compound was not detected. The number of symbols for each age group indicates the number of composites analyzed.

Census region	North Central					
	East North Central			West North Central		
Census division	0-14	15-44	45+	0-14	15-44	45+
Compound						
1,2-Dichlorobenzene	--	--+	---	-	-	--
1,2,4-Trichlorobenzene	--	---	--+	-	-	--
Naphthalene	--	+--	++-	+	-	+-
Pentachlorobenzene	--	---	---	-	-	--
Diethyl phthalate	--+	--+	--+	-	+	++
Tributyl phosphate	--+	---	---	-	-	--
Hexachlorobenzene	--	++-	+++	+	+	+-
β -BHC	--+	+++	+++	+	+	++
Phenanthrene	--+	---	---	-	-	--
Di-n-butyl phthalate	--+	---	--+	+	-	--
Heptachlor epoxide	--+	---	+++	+	+	++
Pyrene	--	--	---	-	-	--
<i>trans</i> -Nonachlor	--	--+	--+	-	+	++
p,p'-DDE	++	+++	+++	+	+	++
Dieldrin	--	--+	--+	+	+	+-
p,p'-DDT	--+	---	---	-	-	--
Butylbenzyl phthalate	++	---	+++	+	+	++
Triphenyl phosphate	--+	---	--+	-	-	--
Di-n-octyl phthalate	--	--+	--+	-	-	--
Mirex	--	---	---	-	-	--
tris(2-Chloroethyl) phosphate	--	---	---	-	-	--
Total PCBs	--	+++	+++	+	+	++
Trichlorobiphenyl	--	---	+++	-	-	--
Tetrachlorobiphenyl	--	--+	--+	-	+	++
Pentachlorobiphenyl	--	--+	--+	+	+	++
Hexachlorobiphenyl	--	--+	--+	+	+	++
Heptachlorobiphenyl	--	---	--+	-	+	++
Octachlorobiphenyl	--	--+	--+	-	+	++
Nonachlorobiphenyl	--	---	---	-	-	--
Decachlorobiphenyl	--	---	--+	-	-	--

Figure 8. Incidence of detection of semivolatile organic compounds determined in composited human adipose tissue from the North Central Census Region. A positive (+) value indicates the compound was detected at a trace or positive quantifiable level. A negative (-) value indicates the compound was not detected. The number of symbols for each age group indicates the number of composites analyzed.

Census region Census division	South								
	South Atlantic			East South Central			West South Central		
	0-14	15-44	45+	0-14	15-44	45+	0-14	15-44	45+
Compound									
1,2-Dichlorobenzene	--	----	----	-	-	--	-	--	+
1,2,4-Trichlorobenzene	--	---+	---	-	-	--	-	--	-
Naphthalene	++	---+	++--	-	+	--	+	+-	-
Pentachlorobenzene	--	----	----	-	-	--	-	--	-
Diethyl phthalate	--	---+	---+	+	+	--	+	+-	-
Tributyl phosphate	--	----	----	-	-	--	-	--	-
Hexachlorobenzene	++	++++	++++	+	+	++	-	++	+
β -BHC	++	++++	++++	+	+	++	+	++	+
Phenanthrene	--	---+	----	+	-	--	-	--	-
Di-n-butyl phthalate	-+	---+	---+	+	+	--	+	--	+
Heptachlor epoxide	++	---+	---+	+	+	++	-	++	+
Pyrene	--	----	----	-	-	--	-	--	-
trans-Nonachlor	++	---+	---+	+	+	++	-	++	+
p,p'-DDE	++	++++	++++	+	+	++	+	++	+
Dieldrin	--	---+	---+	+	+	--	-	++	+
p,p'-DDT	++	+++	+++	+	-	-+	+	--	+
Butylbenzyl phthalate	++	+++	+++	+	+	--	+	++	+
Triphenyl phosphate	-+	---	---	+	+	--	-	--	+
Di-n-octyl phthalate	-+	----	---	-	+	--	+	+-	+
Mirex	--	---+	---	-	-	--	-	--	-
tris(2-Chloroethyl) phosphate	--	----	----	-	-	--	+	--	-
Total PCBs	++	+++	+++	+	+	++	+	++	+
Trichlorobiphenyl	--	---	---	+	-	--	-	--	+
Tetrachlorobiphenyl	--	---	---	-	+	--	-	--	+
Pentachlorobiphenyl	++	+++	+++	-	+	++	-	++	+
Hexachlorobiphenyl	++	+++	---	+	+	-+	+	++	+
Heptachlorobiphenyl	--	+++	+++	+	+	++	-	++	+
Octachlorobiphenyl	--	---	+++	+	+	++	+	--	+
Nonachlorobiphenyl	--	----	---	-	+	++	-	--	-
Decachlorobiphenyl	--	----	---	-	-	--	-	--	-

Figure 9. Incidence of detection of semivolatile organic compounds determined in composited human adipose tissue from the South Census Region. A positive (+) value indicates the compound was detected at a trace or positive quantifiable level. A negative (-) value indicates the compound was not detected. The number of symbols for each age group indicates the number of composites analyzed.

The analyses for the PCBs was accomplished through manual identification and quantitation within designated retention windows established for each of the homologs. These figures summarize the incidence of detection of each of the target analytes based on the specific census regions and divisions. A positive (+) value indicates that the compound was detected at a trace or positive quantifiable level. A negative (-) value indicates that the compound was not detected. These figures also indicate the number of composite sample analyses completed for each age group within a specific census division. The number of composite samples analyzed for a specific age group is noted by the number of positive and negative symbols. Table 6 presents the frequency of observation of these target analytes from the 46 composite samples.

Figures 10 and 11 present examples of the HRGC/MS chromatograms of the 6% and 15/50% diethyl ether Florisil fractions for the three age group composites within a specific census division. The HRGC/MS chromatograms for a specific age group composite across three different census divisions is presented in Figures 12 to 15.

The most notable differences between the HRGC/MS analyses for the three age groups within a specific census division is the chromatogram characteristic in the time frame of 13 to 30 min (6% diethyl ether Florisil fraction). This difference, noted as a significant response to a complex matrix, is attributed to the efficiency of the GPC cleanup with respect to differences in the composition of adipose tissue with age (Spearman 1982). Some differences were noted for the three age groups in the response of the UV-detector used to monitor the GPC effluent during bulk lipid cleanup. The lipid profile (noted as the UV response from GPC cleanup) for the 15-44 and particularly the 45+ age groups were typically noted to tail significantly in comparison with the 0-14 age groups.

An automated search of the major chromatographic peaks versus the National Bureau of Standards (NBS) mass spectral reference library indicates that the major peaks in these chromatograms are due to biogenic materials (e.g., fatty acids and cholesterol related components) which are not removed by GPC. A review of the elution profiles presented in Figure 1 demonstrates that these materials elute within the same retention window as the phthalate esters.

a. Organochlorine Pesticides

As noted in Table 6, organochlorine pesticides and related metabolites were determined in a majority of the composite samples analyzed. Trace or positive quantifiable levels of beta-BHC, p,p' -DDE, p,p' -DDT, mirex, *trans* nonachlor, heptachlor epoxide, and dieldrin are reported for the composite samples in Tables 7 to 13. These compounds have been routinely detected with the packed GC/electron capture detector (PGC/ECD) method in past NHATS analysis programs. However, the PGC/ECD data from previous NHATS analysis programs have indicated a higher incidence of detection for many of these compounds. The difference in the incidence of detection between the methods can be attributed to the relative sensitivities of the two instrumental techniques.

Table 6. Incidence of Detection of Selected Semivolatile Organic Compounds in the NHATS FY82 Composite Specimens

Compound	Frequency of observation (%) ^a
1,2-Dichlorobenzene	9
1,2,4-Trichlorobenzene	4
Naphthalene	40
Diethyl phthalate	42
Tributyl phosphate	2
Hexachlorobenzene	76
β -BHC	87
Phenanthrene	13
Di-n-butyl phthalate	44
Heptachlor epoxide	67
<u>trans</u> -Nonachlor	53
p,p'-DDE	93
Dieldrin	31
p,p'-DDT	55
Butylbenzyl phthalate	69
Triphenyl phosphate	36
Di-n-octyl phthalate	31
Mirex	13
<u>tris</u> (2-Chloroethyl)phosphate	2
Total PCBs	83
Trichlorobiphenyl	22
Tetrachlorobiphenyl	53
Pentachlorobiphenyl	73
Hexachlorobiphenyl	73
Heptachlorobiphenyl	53
Octachlorobiphenyl	40
Nonachlorobiphenyl	13
Decachlorobiphenyl	7

^aSample size = 46 composites.

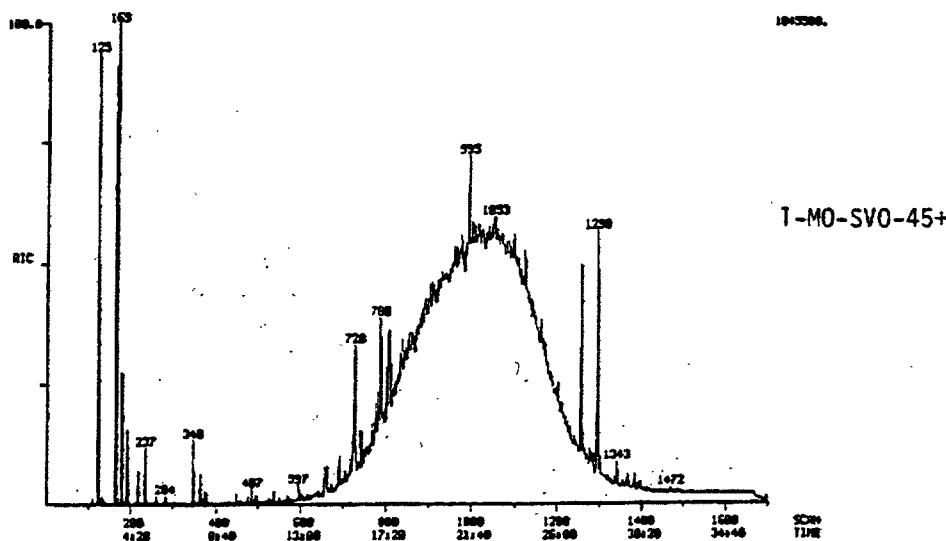
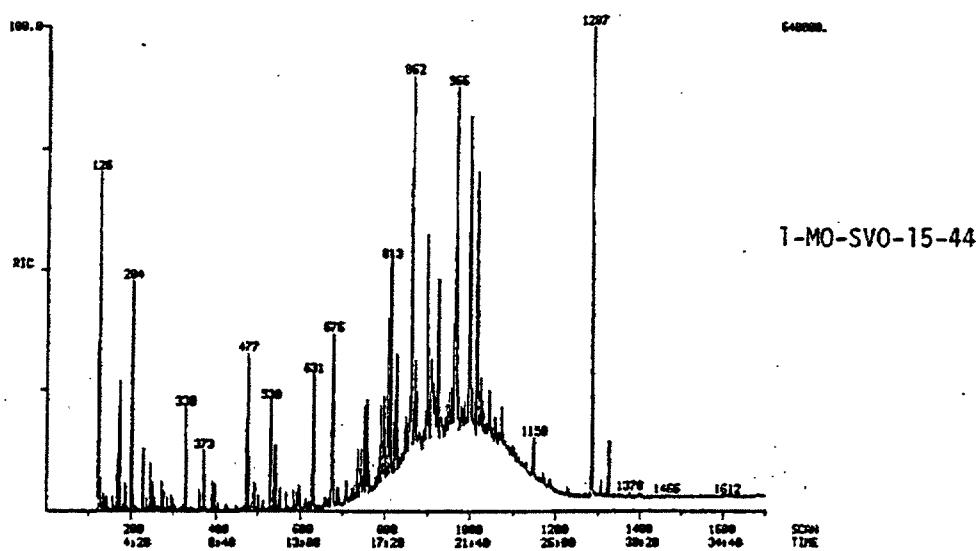
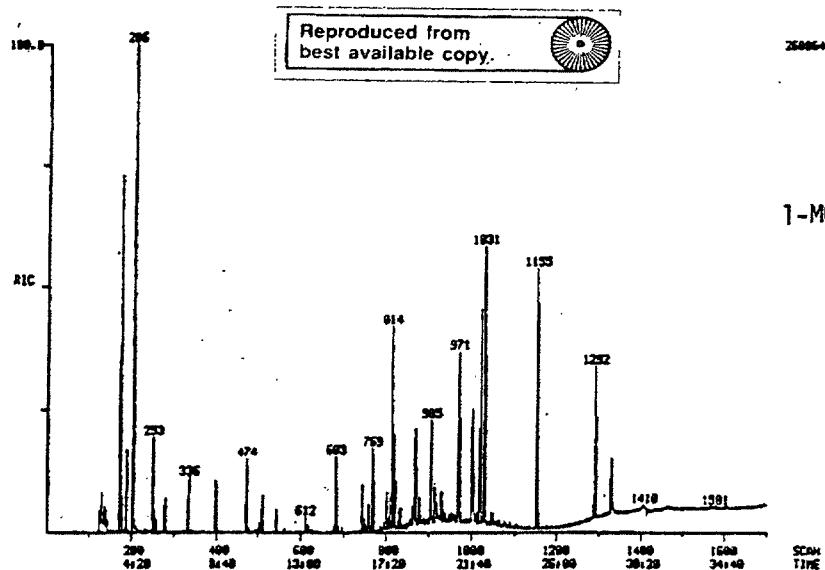


Figure 10. HRGC/MS chromatograms of the 6% diethyl ether Florisil fraction for the three age group composites (0-14, 15-44, and 45+) from the Mountain (MO) census division.

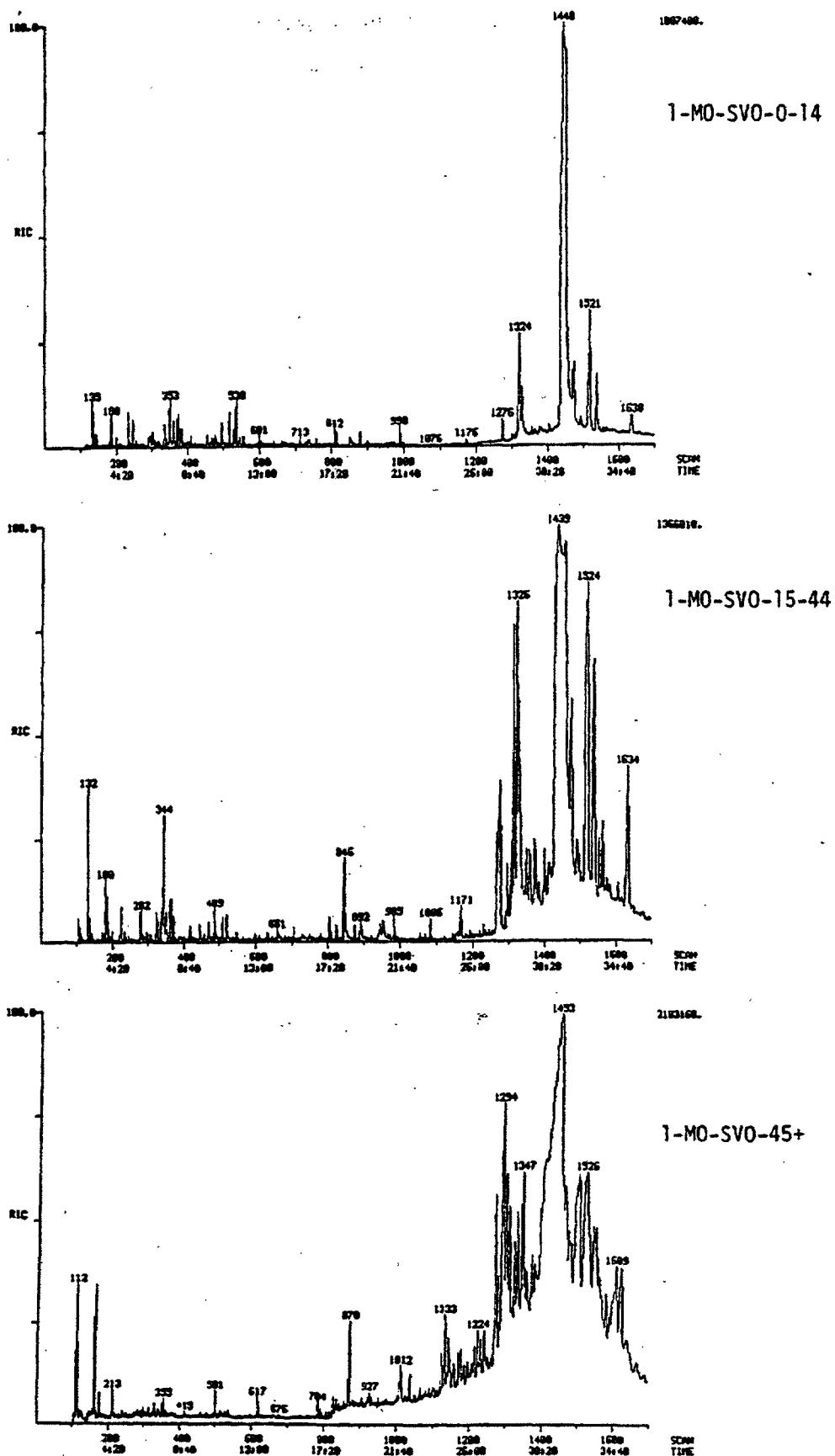


Figure 11. HRGC/MS chromatogram of the 15/50% diethyl ether Florisil fraction for the three age groups (0-14, 15-44, and 45 plus) from the Mountain census division.

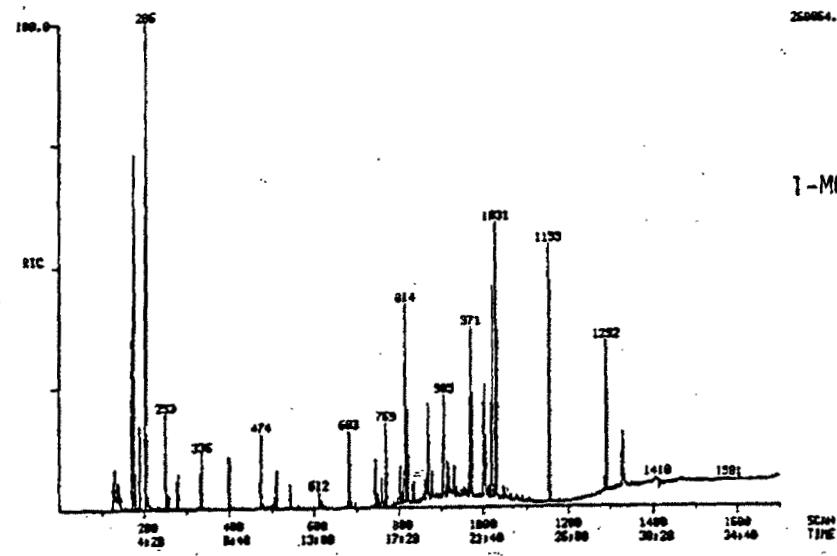
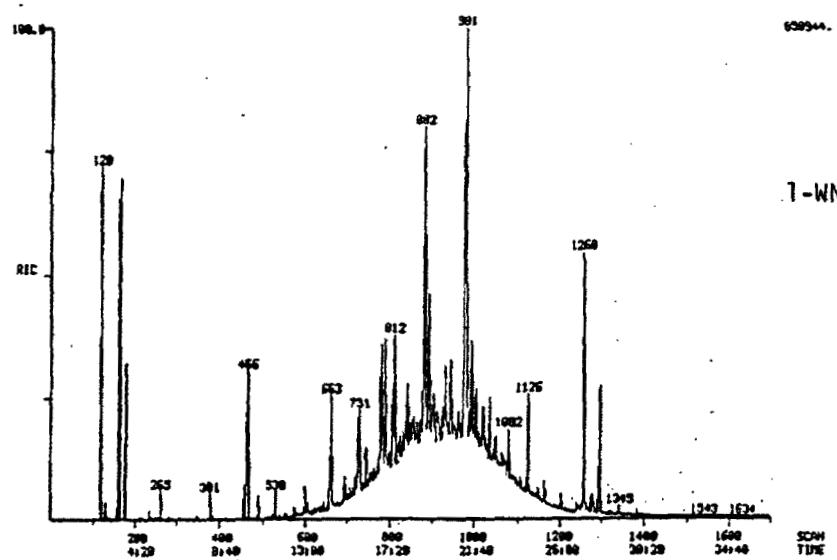
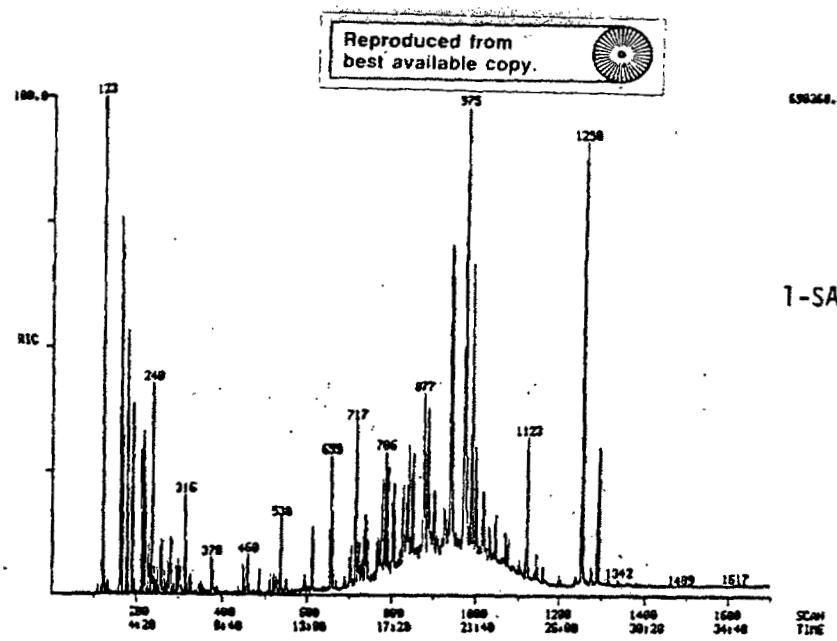


Figure 12. Comparison of the HRGC/MS chromatograms of the 0-14 age composites (6% diethyl ether Florisil fractions) from three census divisions.

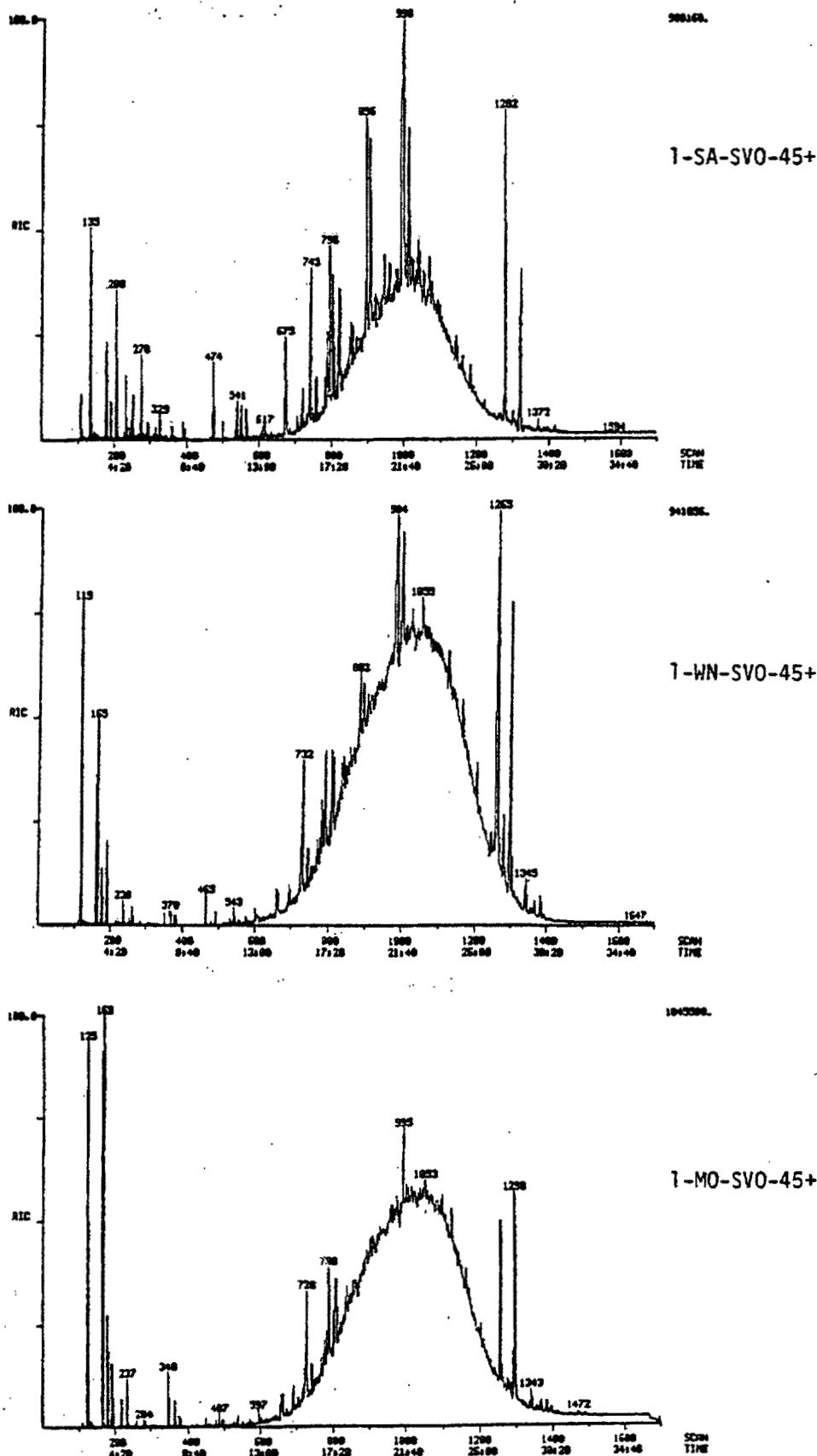
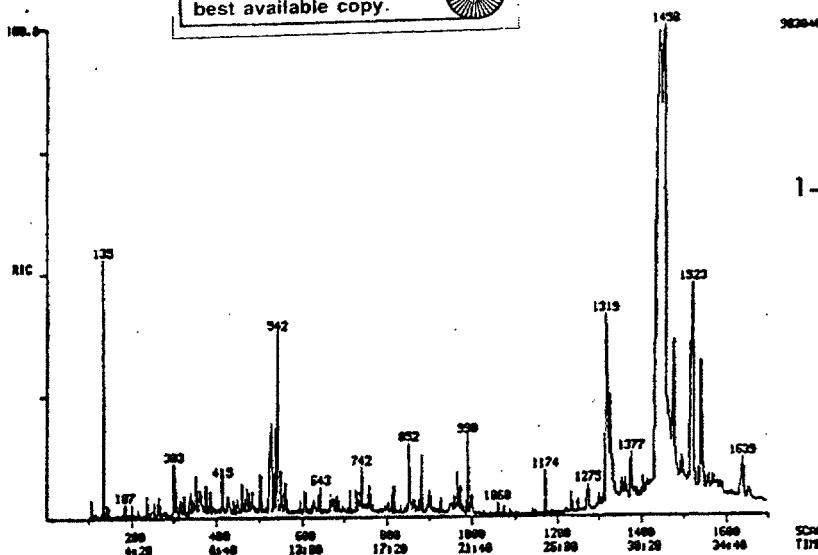


Figure 13. Comparison of the HRGC/MS chromatograms of the 45 plus age composites (6% diethyl ether Florisil fractions) from three census divisions.



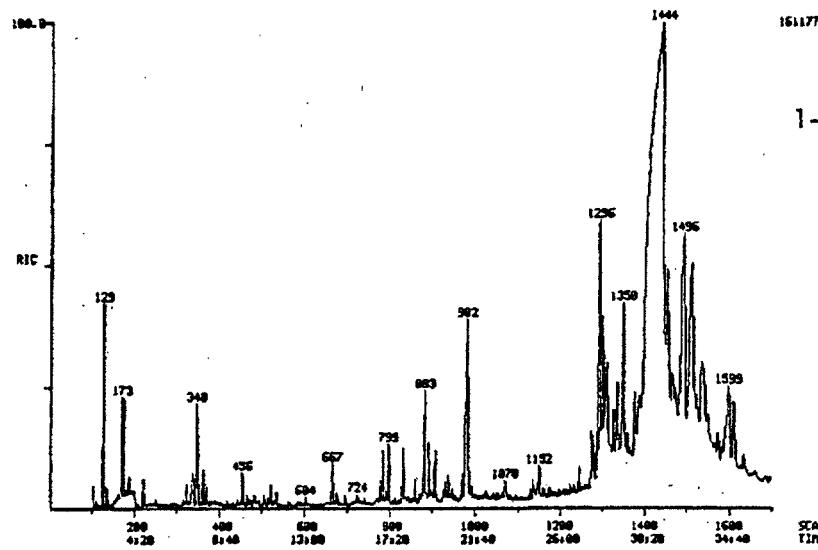
962846.

1-SA-SV0-0-14



1611779.

1-WN-SV0-0-14



1667400.

1-MO-SV0-0-14

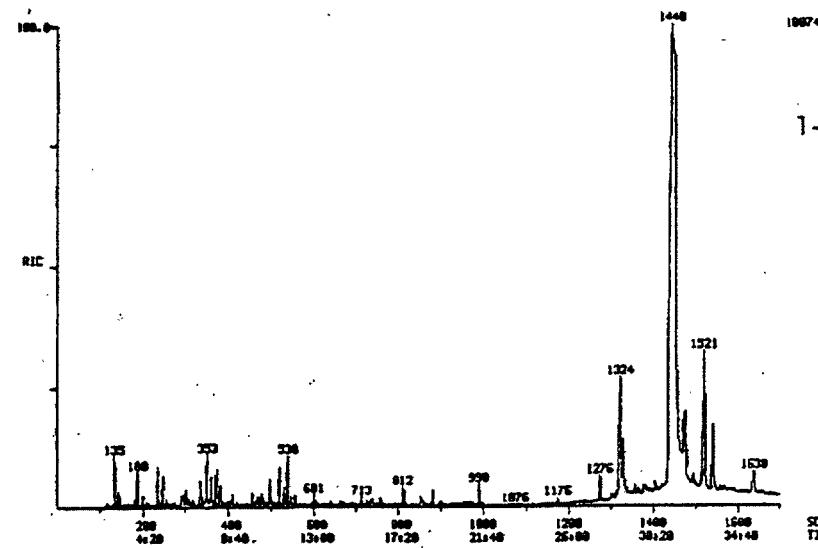


Figure 14. Comparison of the HRGC/MS chromatograms of the 0-14 age composites (15/50% diethyl ether Florisil fractions) from three census divisions.

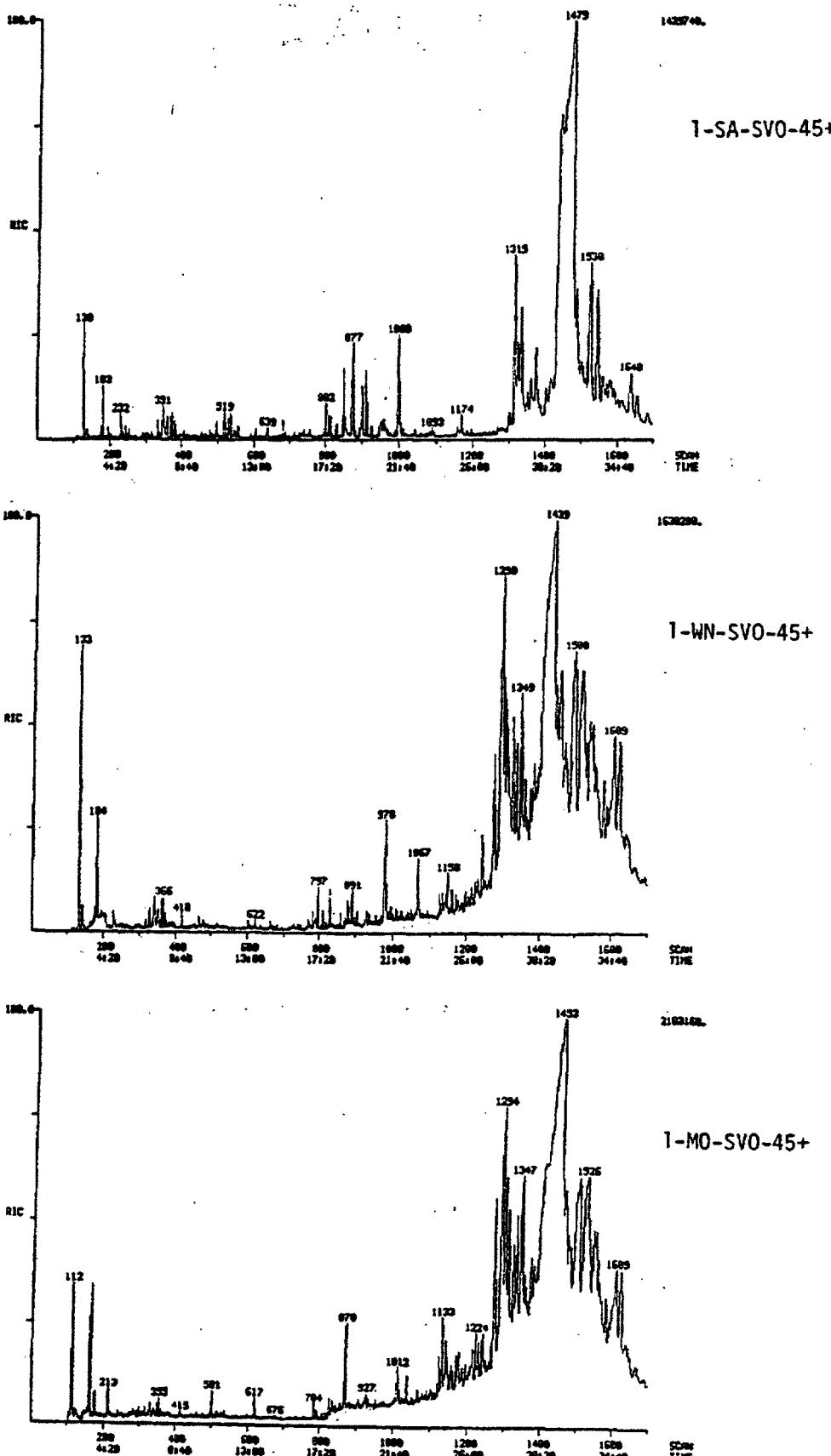


Figure 15. Comparison of the HRGC/MS chromatograms of the 45 plus age composites (15/50% diethyl ether Florisil fractions) from three census divisions.

Table 7. Data Report - Beta-BHC (CAS No. 319-85-7) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analysis date
1-MO-SVO-0-14	82-036	9.0	5.6 (62.3)	ND (0.20)	ND (0.022)	ND (0.036)	4/19/84
1-MO-SVO-15-44	82-037	18.3	13.6 (74.1)	ND	0.079	0.11	4/19/84
1-MO-SVO-45+	82-041	21.0	17.7 (84.3)	4.63	0.22	0.26	5/10/84
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	ND (0.20)	ND (0.010)	ND (0.019)	4/6/84
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	ND	0.50	0.57	4/5/84
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	2.00	0.075	0.095	4/6/84
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	tr	0.48	tr	4/19/84
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	c	c	c	4/19/84
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	1.60	0.070	0.090	4/6/84
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	9.1	0.36	0.45	4/5/84
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	2.0	0.12	0.15	6/1/84
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	1.5	0.074	0.087	6/12/84
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	1.4	0.053	0.067	6/12/84
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	3.4	0.19	0.22	6/12/84
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	ND (0.20)	ND (0.011)	ND (0.023)	4/19/84
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	1.3	0.059	0.079	4/20/84
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	3.8	0.19	0.24	4/20/84
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	tr	0.42	tr	0.028
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	1.7	0.081	0.097	6/5/84
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	2.2	0.082	0.099	6/4/84
3-EN-SVO-0-14	82-061	20.2	16.8 (83.2)	tr	0.63	tr	0.037
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	3.4	0.15	0.17	6/6/84
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	tr	0.77	tr	0.052
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	1.9	0.090	0.12	5/4/84
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	6.0	0.27	0.30	5/7/84
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	1.8	0.036	0.11	6/5/84

Table 7 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total lipid detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis date
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	3.5	0.17	0.20	5/11/84
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	2.2	0.083	0.096	4/20/84
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	4.7	0.23	0.28	4/20/84
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	tr	0.59	tr	0.044
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	1.1	0.054	0.061	6/18/84
3-SA-SV0-0-14	82-073	17.9	12.6 (70.4)	0.95	0.053	0.075	6/5/84
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	3.2	0.18	0.21	6/12/84
4-SA-SV0-15-44	82-075	18.2	13.1 (72.0)	1.5	0.084	0.12	6/6/84
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	2.2	0.12	0.18	6/12/84
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	8.5	0.30	0.39	6/1/84
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	6.8	0.34	0.41	5/10/84
1-ES-SV0-45+	82-079	20.7	18.3 (88.4)	9.8	0.47	0.53	5/10/84
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	4.6	0.22	0.28	6/6/84
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	tr	0.43	tr	0.057
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	6.6	0.29	0.34	5/4/84
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	12	0.53	0.56	5/7/84
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	1.8	0.084	0.097	6/18/84

^aThe estimated limit of detection (LOD) for this compound is 0.20 μg/sample (2.5 x S/N). The estimated limit of quantitation (LOQ) for this compound is 0.80 μg/sample (10 x S/N).

^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

cData not summarized.

Table 8. Data Report - P,P'-ODE (CAS No. 72-55-9) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analysis date
1-MO-SV0-0-14	82-036	9.0	5.6 (62.3)	5.1	0.56	0.90	4/19/84
1-MO-SV0-15-44	82-037	18.3	13.6 (74.1)	8.1	0.44	0.60	4/19/84
1-MO-SV0-45+	82-041	21.0	17.7 (84.3)	24	1.2	1.4	5/10/84
1-NE-SV0-0-14	82-042	19.1	10.5 (55.1)	1.4	0.074	4/6/84	
1-NE-SV0-15-44	82-043	21.9	19.2 (87.6)	47	2.1	2.4	4/5/84
1-NE-SV0-45+	82-044	26.7	21.1 (79.2)	20	0.75	0.95	4/6/84
1-PA-SV0-0-14	82-046	19.7	12.4 (62.9)	ND (0.20)	0.16	0.26	4/19/84
1-PA-SV0-45+	82-048	22.0	19.2 (87.1)	ND (0.009)	ND (0.010)	4/19/84	
1-MA-SV0-0-14	82-049	23.0	17.8 (77.5)	15	0.66	0.85	4/6/84
1-MA-SV0-15-44	82-050	25.2	20.3 (80.7)	45	1.8	2.2	4/5/84
1-MA-SV0-45+	82-051	16.2	13.4 (82.5)	10	0.62	0.75	6/1/84
2-MA-SV0-0-14	82-052	20.2	17.1 (84.7)	9.3	0.45	0.54	6/12/84
2-MA-SV0-15-44	82-053	26.1	20.4 (78.2)	7.5	0.29	0.37	6/12/84
2-MA-SV0-45+	82-054	18.0	15.1 (83.9)	9.4	0.052	0.063	6/12/84
1-EN-SV0-0-14	82-055	18.1	8.8 (48.6)	1.1	0.060	0.12	4/19/84
1-EN-SV0-15-44	82-056	21.6	16.3 (75.5)	8.3	0.39	0.51	4/20/84
1-EN-SV0-45+	82-057	19.8	16.0 (80.6)	16	0.83	1.0	4/20/84
2-EN-SV0-0-14	82-058	21.2	14.7 (69.3)	2.2	0.10	0.15	6/5/84
2-EN-SV0-15-44	82-059	21.4	17.8 (83.2)	tr	0.44	0.025	6/5/84
2-EN-SV0-45+	82-060	26.2	21.8 (83.2)	24	0.92	1.10	6/4/84
3-EN-SV0-15-44	82-061	20.2	16.8 (83.2)	5.8	0.29	0.34	6/5/84
3-EN-SV0-45+	82-062	23.2	19.8 (85.3)	18	0.77	0.91	6/6/84
1-WN-SV0-0-14	82-063	23.4	14.8 (63.1)	4.4	0.19	0.30	5/7/84
1-WN-SV0-15-44	82-064	20.6	15.7 (76.2)	14	0.70	0.92	5/4/84
1-WN-SV0-45+	82-065	22.5	20.2 (89.8)	31	1.4	1.6	5/7/84
2-WN-SV0-45+	82-066	21.4	17.2 (80.4)	11	0.50	0.62	6/5/84

Table 8 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg)	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analysis date
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	7.3	0.36	0.42	5/11/84
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	12	0.45	0.52	4/20/84
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	16	0.81	0.98	4/20/84
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	4.6	0.24	0.35	6/5/84
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	8.9	0.46	0.51	6/18/84
2-SA-SV0-45+	82-072	26.1	21.9 (83.9)	1.6	0.061	0.073	6/4/84
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	18	1.0	1.5	6/5/84
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	20	1.1	1.3	6/12/84
4-SA-SV0-15-44	82-075	18.2	13.1 (72.0)	16	0.88	1.2	6/6/84
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	tr	0.024	tr	6/12/84
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	38	1.3	1.7	6/1/84
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	46	2.3	2.8	5/10/84
1-ES-SV0-45+	82-079	20.7	18.3 (88.4)	43	2.1	2.4	5/10/84
2-ES-SV0-15-44	82-080	25.7	22.5 (87.5)	ND (0.20)	ND (0.008)	ND (0.009)	6/6/84
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	39	1.9	2.4	6/6/84
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	6.1	0.55	0.82	5/8/84
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	23	1.0	1.2	5/4/84
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	140	6.4	6.8	5/7/84
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	13	0.61	0.71	6/18/84

aThe estimated limit of detection (LOD) for this compound is 0.20 µg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LOQ) for this compound is 0.80 µg/sample ($10 \times S/N$).

bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

Table 9. Data Report - $\text{P},\text{P}'\text{-DDT}$ (CAS No. 50-29-3) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analysis date %
1-MO-SVO-0-14	82-036	9.0	5.6 (62.3)	tr 0.21	tr 0.023	tr 0.037	4/19/84
1-MO-SVO-15-44	82-037	18.3	13.6 (74.1)	tr 0.90	tr 0.049	tr 0.066	4/19/84
1-MO-SVO-45+	82-041	21.0	17.7 (84.3)	2.4	0.11	0.14	5/10/84
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	ND (0.20)	ND (0.010)	ND (0.019)	4/6/84
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	6.8	0.31	0.35	4/5/84
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	7.1	0.27	0.34	4/6/84
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	tr 0.27	tr 0.014	tr 0.022	4/19/84
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	ND (0.20)	ND (0.009)	ND (0.010)	4/19/84
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	1.0	0.042	0.054	4/6/84
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	4.8	0.19	0.24	4/5/84
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	ND (0.20)	ND (0.012)	ND (0.015)	6/1/84
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	tr 0.63	tr 0.031	tr 0.037	6/12/84
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	ND (0.20)	ND (0.008)	ND (0.010)	6/12/84
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	2.3	0.13	0.15	6/12/84
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	ND (0.20)	ND (0.011)	ND (0.022)	4/19/84
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	1.6	0.075	0.099	4/20/84
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	ND (0.20)	ND (0.010)	ND (0.013)	4/20/84
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	tr 0.28	tr 0.013	tr 0.019	6/5/84
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	tr 0.52	tr 0.024	tr 0.029	6/5/84
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	ND (0.20)	ND (0.008)	ND (0.009)	6/4/84
3-EN-SVO-0-14	82-061	20.2	16.8 (83.2)	c	c	c	6/15/84
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	ND (0.20)	ND (0.009)	ND (0.010)	6/6/84
1-MN-SVO-0-14	82-063	23.4	14.8 (63.1)	c	c	c	5/7/84
1-MN-SVO-15-44	82-064	20.6	15.7 (76.2)	ND (0.20)	ND (0.010)	ND (0.013)	5/4/84
1-MN-SVO-45+	82-065	22.5	20.2 (89.8)	2.4	0.11	0.12	5/7/84
2-MN-SVO-45+	82-066	21.4	17.2 (80.4)	c	c	c	6/5/84

Table 9 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (μg)	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis Date %
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	1.1	0.051	0.060	5/11/84
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	1.6	0.061	0.070	4/20/84
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	2.4	0.12	0.14	4/20/84
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	tr 0.72	tr 0.038	tr 0.055	6/5/84
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	2.2	0.11	0.13	6/18/84
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	6.8	0.38	0.54	6/5/84
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	ND (0.20)	ND (0.011)	ND (0.013)	6/12/84
4-SA-SV0-15-44	82-075	18.2	13.1 (72.0)	c	c	c	6/6/84
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	2.8	0.16	0.22	6/12/84
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	9.0	0.32	ND (0.009)	6/1/84
1-ES-SV0-45+	82-079	20.7	18.3 (88.4)	ND (0.20)	c	c	5/10/84
2-ES-SV0-15-44	82-080	25.7	22.5 (87.5)	c	0.29	0.37	6/6/84
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	6.16	c	c	6/18/84
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	tr 0.34	tr 0.031	tr 0.045	5/8/84
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	c	c	c	5/4/84
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	5.7	0.25	0.27	5/7/84
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	ND (0.20)	ND (0.008)	ND (0.009)	6/18/84

^aThe estimated limit of detection (LOD) is 0.20 μg/sample (2.5 x S/N). The estimated limit of quantitation (LQ) is 0.80 μg/sample (10 x S/N).

^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LQ.

^cData not summarized.

Table 10. Data Report - Mirrex (CAS No. 2385-85-5) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis date
1-MO-SVO-0-14	82-036	9.0	5.6 (62.3)	ND (0.20)	ND (0.022)	ND (0.036)	4/19/84
1-MO-SVO-15-44	82-037	18.3	13.6 (74.1)	ND (0.20)	ND (0.011)	ND (0.015)	4/19/84
1-MO-SVO-45+	82-041	21.0	17.7 (84.3)	ND (0.20)	ND (0.010)	ND (0.013)	5/10/84
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	ND (0.20)	ND (0.010)	ND (0.019)	4/6/84
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	tr 0.70	tr 0.032	tr 0.037	4/5/84
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	tr 0.61	tr 0.023	tr 0.029	4/6/84
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	ND (0.20)	ND (0.010)	ND (0.016)	4/19/84
1-PA-SVO-15-44	82-048	22.0	19.2 (87.1)	ND (0.20)	ND (0.009)	ND (0.010)	4/19/84
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	ND (0.20)	ND (0.009)	ND (0.011)	4/6/84
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	ND (0.20)	ND (0.008)	ND (0.010)	4/5/84
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	ND (0.20)	ND (0.012)	ND (0.015)	6/1/84
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	ND (0.20)	ND (0.010)	ND (0.012)	6/12/84
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	ND (0.20)	ND (0.008)	ND (0.010)	6/12/84
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	ND (0.20)	ND (0.011)	ND (0.013)	6/12/84
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	ND (0.20)	ND (0.011)	ND (0.023)	4/19/84
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	ND (0.20)	ND (0.009)	ND (0.012)	4/20/84
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	ND (0.20)	ND (0.010)	ND (0.013)	4/20/84
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	ND (0.20)	ND (0.009)	ND (0.014)	6/5/84
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	ND (0.20)	ND (0.009)	ND (0.011)	6/5/84
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	ND (0.20)	ND (0.008)	ND (0.009)	6/4/85
3-EN-SVO-0-14	82-061	20.2	16.8 (83.2)	ND (0.20)	ND (0.010)	ND (0.012)	6/5/84
3-EN-SVO-15-44	82-062	23.2	19.8 (85.3)	ND (0.20)	ND (0.009)	ND (0.010)	6/6/84
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	ND (0.20)	ND (0.009)	ND (0.014)	5/7/84
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	ND (0.20)	ND (0.010)	ND (0.013)	5/4/84
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	ND (0.20)	ND (0.009)	ND (0.010)	5/7/84
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	ND (0.20)	ND (0.009)	ND (0.012)	6/5/84

Table 10 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analysis date
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	ND (0.20)	ND (0.010)	ND (0.012)	5/11/84
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	tr 0.22	tr 0.008	tr 0.010	4/20/84
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	ND (0.20)	ND (0.010)	ND (0.012)	4/20/84
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	ND (0.20)	ND (0.010)	ND (0.015)	6/5/84
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	ND (0.20)	ND (0.010)	ND (0.011)	6/18/84
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	tr 0.31	tr 0.017	tr 0.024	6/5/84
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	tr 0.58	tr 0.032	tr 0.037	6/12/84
4-SA-SV0-15-44	82-075	18.2	13.1 (72.0)	ND (0.20)	ND (0.011)	ND (0.015)	6/6/84
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	ND (0.20)	ND (0.011)	ND (0.016)	6/12/84
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	ND (0.20)	ND (0.007)	ND (0.009)	6/1/84
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	ND (0.20)	ND (0.010)	ND (0.012)	5/10/84
1-ES-SV0-45+	82-079	20.7	18.3 (88.4)	ND (0.20)	ND (0.011)	ND (0.012)	5/10/84
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	ND (0.20)	ND (0.009)	ND (0.012)	6/18/84
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	ND (0.20)	ND (0.018)	ND (0.027)	5/8/84
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	ND (0.20)	ND (0.009)	ND (0.010)	5/4/84
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	0.88	0.039	0.041	5/7/84
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	ND (0.20)	ND (0.009)	ND (0.011)	6/18/84

^aThe estimated limit of detection (LOD) is 0.20 µg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LQ) is 0.80 µg/sample ($10 \times S/N$). ND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LQ.

Table 11. Data Report - trans-Nonachlor (CAS No. 39765-80-5) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg)	Concentration - wet tissue (µg/g) ^b	Concentration - extractable lipid (µg/g)	Analysis date	
1-MO-SV0-0-14	82-036	9.0	5.6 (62.3)	ND (0.40)	ND (0.044)	ND (0.071)	4/19/84	
1-MO-SV0-15-44	82-037	18.3	13.6 (74.1)	ND (0.40)	ND (0.021)	ND (0.029)	4/19/84	
1-MO-SV0-45+	82-041	21.0	17.7 (84.3)	2.8	0.13	0.156	5/10/84	
1-NE-SV0-0-14	82-042	19.1	10.5 (55.1)	ND (0.40)	ND (0.021)	ND (0.038)	4/6/84	
1-NE-SV0-15-44	82-043	21.9	19.2 (87.6)	ND (0.40)	0.45	0.52	4/5/84	
1-NE-SV0-45+	82-044	26.7	21.1 (79.2)	ND (0.40)	ND (0.015)	ND (0.019)	4/6/84	
1-PA-SV0-0-14	82-046	19.7	12.4 (62.9)	ND (0.40)	ND (0.020)	ND (0.032)	4/19/84	
1-PA-SV0-45+	82-048	22.0	19.2 (87.1)	ND (0.40)	ND (0.018)	ND (0.021)	4/19/84	
1-MA-SV0-0-14	82-049	23.0	17.8 (77.5)	tr	0.86	tr	0.037	
1-MA-SV0-15-44	82-050	25.2	20.3 (80.7)	tr	9.8	0.39	tr	0.048
1-MA-SV0-45+	82-051	16.2	13.4 (82.5)	tr	0.92	tr	0.057	
2-MA-SV0-0-14	82-052	20.2	17.1 (84.7)	tr	0.81	tr	0.040	
2-MA-SV0-15-44	82-053	26.1	20.4 (78.2)	tr	1.0	tr	0.038	
2-MA-SV0-45+	82-054	18.0	15.1 (83.9)	ND (0.40)	ND (0.022)	ND (0.026)	6/12/84	
1-EN-SV0-0-14	82-055	18.1	8.8 (48.6)	ND (0.40)	ND (0.022)	ND (0.045)	4/19/84	
1-EN-SV0-15-44	82-056	21.6	16.3 (75.5)	ND (0.40)	ND (0.019)	ND (0.025)	4/20/84	
1-EN-SV0-45+	82-057	19.8	16.0 (80.6)	ND (0.40)	ND (0.020)	ND (0.025)	4/20/84	
2-EN-SV0-0-14	82-058	21.2	14.7 (69.3)	ND (0.40)	ND (0.019)	ND (0.027)	6/5/84	
2-EN-SV0-15-44	82-059	21.4	17.8 (83.2)	ND (0.40)	ND (0.019)	ND (0.022)	6/5/84	
2-EN-SV0-45+	82-060	26.2	21.8 (83.2)	1.9	0.074	0.089	6/4/84	
3-EN-SV0-0-14	82-061	20.2	16.8 (83.2)	tr	0.42	tr	0.025	
3-EN-SV0-15-44	82-062	23.2	19.8 (85.3)	tr	1.3	tr	0.056	
3-EN-SV0-45+							6/6/84	
1-WN-SV0-0-14	82-063	23.4	14.8 (63.1)	ND (0.40)	ND (0.017)	ND (0.027)	5/7/84	
1-WN-SV0-15-44	82-064	20.6	15.7 (76.2)	tr	0.54	tr	0.026	
1-WN-SV0-45+	82-065	22.5	20.2 (89.8)	tr	1.5	tr	0.068	
2-WN-SV0-45+	82-066	21.4	17.2 (80.4)	tr	0.87	tr	0.041	
							6/5/84	

Table 11 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (μg)	Concentration - wet tissue (μg/g) ^b	Concentration - extractable lipid (μg/g)	Analysis date
1-SA-SVO-0-14	82-067	20.7	16.8 (83.9)	tr 0.70	tr 0.034	tr 0.041	5/11/84
1-SA-SVO-15-44	82-068	26.4	22.8 (86.4)	ND (0.40)	ND (0.015)	ND (0.018)	4/20/84
1-SA-SVO-45+	82-069	20.0	16.5 (82.5)	ND (0.40)	ND (0.020)	ND (0.024)	4/20/84
2-SA-SVO-0-14	82-070	19.1	13.2 (69.1)	ND (0.40)	ND (0.021)	ND (0.030)	6/5/84
2-SA-SVO-15-44	82-071	19.5	17.4 (89.3)	c	c	c	6/18/84
3-SA-SVO-0-14	82-073	17.9	12.6 (70.4)	tr 1.2	tr 0.067	tr 0.095	6/5/84
3-SA-SVO-15-44	82-074	18.0	15.6 (86.7)	tr 0.41	tr 0.023	tr 0.027	6/12/84
3-SA-SVO-45+	82-074	18.0	15.6 (86.7)	tr 0.41	tr 0.023	tr 0.027	6/12/84
4-SA-SVO-0-14	82-075	18.2	13.1 (72.0)	tr 1.2	tr 0.064	tr 0.089	6/6/84
4-SA-SVO-45+	82-076	17.6	12.4 (70.5)	ND (0.40)	ND (0.023)	ND (0.033)	6/12/84
1-ES-SVO-0-14	82-077	28.1	21.7 (77.2)	1.5	0.052	0.066	6/11/84
1-ES-SVO-15-44	82-078	19.9	16.6 (83.2)	4.6	0.23	0.29	5/10/84
1-ES-SVO-45+	82-079	20.7	18.3 (88.4)	4.1	0.20	0.23	5/10/84
2-ES-SVO-45+	82-081	21.1	16.5 (78.2)	2.9	0.14	0.17	6/6/84
1-W5-SVO-0-14	82-082	11.1	7.5 (67.6)	ND (0.40)	ND (0.036)	ND (0.053)	5/8/84
1-W5-SVO-15-44	82-083	22.7	19.7 (86.7)	tr 1.1	tr 0.047	tr 0.055	5/4/84
1-W5-SVO-45+	82-084	22.4	21.2 (94.6)	tr 2.0	tr 0.087	tr 0.092	5/7/84
2-W5-SVO-15-44	82-085	21.9	18.9 (86.3)	tr 0.97	tr 0.044	tr 0.051	6/18/84

^aThe estimated limit of detection (LOD) is 0.40 μg/sample (2.5 × S/N). The estimated limit of quantitation (LQ) is 1.6 μg/sample (10 × S/N).

^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LQ.

cCompound present but data not summarized.

Table 12. Data Report - Heptachlor Epoxide (CAS No. 1024-57-3) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analysis date
1-M0-SV0-0-14	82-036	9.0	5.6 (62.3)	ND (0.20)	ND (0.022)	ND (0.036)	4/19/84
1-M0-SV0-15-44	82-037	18.3	13.6 (74.1)	ND (0.20)	ND (0.011)	ND (0.015)	4/19/84
1-M0-SV0-45+	82-041	21.0	17.7 (84.3)	1.0	0.048	0.057	5/10/84
1-NE-SV0-0-14	82-042	19.1	10.5 (55.1)	ND (0.20)	ND (0.010)	ND (0.019)	4/6/84
1-NE-SV0-15-44	82-043	21.9	19.2 (87.6)	4.5	0.21	0.23	4/5/84
1-NE-SV0-45+	82-044	26.7	21.1 (79.2)	ND (0.20)	ND (0.007)	ND (0.009)	4/6/84
1-PA-SV0-0-14	82-046	19.7	12.4 (62.9)	ND (0.20)	ND (0.010)	ND (0.016)	4/19/84
1-PA-SV0-45+	82-048	22.0	19.2 (87.1)	ND (0.20)	ND (0.009)	ND (0.010)	4/19/84
1-MA-SV0-0-14	82-049	23.0	17.8 (77.5)	tr 0.58	tr 0.025	tr 0.033	4/6/84
1-MA-SV0-15-44	82-050	25.2	20.3 (80.7)	6.3	0.25	0.31	4/5/84
1-MA-SV0-45+	82-051	16.2	13.4 (82.5)	tr 0.62	tr 0.038	tr 0.046	6/1/84
2-MA-SV0-0-14	82-052	20.2	17.1 (84.7)	tr 0.40	tr 0.020	tr 0.023	6/12/84
2-MA-SV0-15-44	82-053	26.1	20.4 (78.2)	tr 0.57	tr 0.022	tr 0.028	6/12/84
2-MA-SV0-45+	82-054	18.0	15.1 (83.9)	ND (0.20)	ND (0.011)	ND (0.013)	6/12/84
1-EN-SV0-0-14	82-055	18.1	8.8 (48.6)	ND (0.20)	ND (0.011)	ND (0.023)	4/19/84
1-EN-SV0-15-44	82-056	21.6	16.3 (75.0)	ND (0.20)	ND (0.009)	ND (0.012)	4/20/84
1-EN-SV0-45+	82-057	19.8	16.0 (80.6)	tr 0.55	tr 0.028	tr 0.034	4/20/84
2-EN-SV0-0-14	82-058	21.2	14.7 (69.3)	tr 0.26	tr 0.012	tr 0.018	6/5/84
2-EN-SV0-15-44	82-059	21.4	17.8 (83.2)	tr 0.36	tr 0.017	tr 0.020	6/5/84
2-EN-SV0-45+	82-060	26.2	21.8 (83.2)	1.1	0.042	0.051	6/4/84
3-EN-SV0-15-44	82-061	20.2	16.8 (83.2)	tr 0.45	tr 0.022	tr 0.027	6/5/84
3-EN-SV0-45+	82-062	23.2	19.8 (85.3)	1.0	0.044	0.051	6/6/84
1-WN-SV0-0-14	82-063	23.4	14.8 (63.1)	tr 0.41	tr 0.017	tr 0.028	5/7/84
1-WN-SV0-15-44	82-064	20.6	15.7 (76.2)	tr 0.73	tr 0.035	tr 0.046	5/4/84
1-WN-SV0-45+	82-065	22.5	20.2 (89.8)	1.2	0.051	0.057	5/7/84
2-WN-SV0-45+	82-066	21.4	17.2 (80.4)	tr 0.51	tr 0.024	tr 0.030	6/5/84

Table 12 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis date
1-SA-SVO-0-14	82-067	20.7	16.8 (83.9)	tr 0.55	tr 0.026	tr 0.031	5/11/84
1-SA-SVO-15-44	82-068	26.4	22.8 (86.4)	ND (0.20)	ND (0.008)	ND (0.009)	4/20/84
1-SA-SVO-45+	82-069	20.0	16.5 (82.5)	ND (0.20)	ND (0.010)	ND (0.012)	4/20/84
2-SA-SVO-0-14	82-070	19.1	13.2 (69.1)	ND (0.20)	ND (0.010)	ND (0.015)	6/5/84
2-SA-SVO-15-44	82-071	19.5	17.4 (89.3)	tr 0.58	tr 0.030	tr 0.033	6/18/84
3-SA-SVO-15-44	82-073	17.9	12.6 (70.4)	tr 0.33	tr 0.018	tr 0.026	6/5/84
3-SA-SVO-45+	82-074	18.0	15.6 (86.7)	tr 1.0	tr 0.055	tr 0.064	6/12/84
4-SA-SVO-15-44	82-075	18.2	13.1 (72.0)	tr 0.43	tr 0.024	tr 0.033	6/6/84
4-SA-SVO-45+	82-076	17.6	12.4 (70.5)	tr 0.64	tr 0.036	tr 0.051	6/12/84
1-ES-SVO-0-14	82-077	28.1	21.7 (77.2)	tr 0.31	tr 0.011	tr 0.014	6/1/84
1-ES-SVO-15-44	82-078	19.9	16.6 (83.2)	tr 2.8	tr 0.14	tr 0.17	5/10/84
1-ES-SVO-45+	82-079	20.7	18.3 (88.4)	tr 1.7	tr 0.082	tr 0.093	5/10/84
2-ES-SVO-45+	82-081	21.1	16.5 (78.2)	tr 0.62	tr 0.029	tr 0.037	6/6/84
1-W-SVO-0-14	82-082	11.1	7.5 (67.6)	ND (0.20)	ND (0.018)	ND (0.027)	5/8/84
1-W-SVO-15-44	82-083	22.7	19.7 (86.7)	tr 1.0	tr 0.045	tr 0.052	5/4/84
1-W-SVO-45+	82-084	22.4	21.2 (94.6)	tr 1.6	tr 0.072	tr 0.076	5/7/84
2-W-SVO-15-44	82-085	21.9	18.9 (86.3)	tr 0.73	tr 0.033	tr 0.039	6/18/84

^aThe estimated limit of detection (LOD) is 0.20 μg/sample (2.5 × S/N). The estimated limit of quantitation (LQ) is 0.80 μg/sample (10 × S/N). ND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LQ.

Table 13. Data Report - Dielodrin (CAS No. 60-57-1) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (ug) ^b	Concentration - wet tissue (ug/g)	Concentration - extractable lipid (ug/g)	Analysis date
1-MO-SV0-0-14	82-036	9.0	5.6 (62.3)	ND (1.0)	ND (0.11)	ND (0.18)	4/24/84
1-MO-SV0-15-44	82-037	18.3	13.6 (74.1)	ND (1.0)	ND (0.055)	ND (0.074)	4/24/84
1-MO-SV0-45+	82-041	21.0	17.7 (84.3)	ND (1.0)	ND (0.048)	ND (0.056)	5/14/84
1-NE-SV0-0-14	82-042	19.1	10.5 (55.1)	ND (1.0)	ND (0.052)	ND (0.095)	4/23/84
1-NE-SV0-15-44	82-043	21.9	19.2 (87.6)	ND (1.0)	ND (0.046)	ND (0.052)	4/10/84
1-NE-SV0-45+	82-044	26.7	21.1 (79.2)	ND (1.0)	ND (0.037)	ND (0.047)	4/23/84
1-PA-SV0-0-14	82-046	19.7	12.4 (62.9)	ND (1.0)	ND (0.051)	ND (0.081)	4/24/84
1-PA-SV0-15-44	82-047	21.6	14.7 (68.0)	ND (1.0)	ND (0.046)	ND (0.068)	4/27/84
1-PA-SV0-45+	82-048	22.0	19.2 (87.1)	ND (1.0)	ND (0.045)	ND (0.052)	4/25/84
1-MA-SV0-0-14	82-049	23.0	17.8 (77.5)	ND (1.0)	ND (0.043)	ND (0.056)	4/23/84
1-MA-SV0-15-44	82-050	25.2	20.3 (80.7)	ND (1.0)	ND (0.040)	ND (0.049)	4/12/84
1-MA-SV0-45+	82-051	16.2	13.4 (82.5)	ND (1.0)	ND (0.062)	ND (0.075)	4/24/84
2-MA-SV0-0-14	82-052	20.2	17.1 (84.7)	ND (1.0)	ND (0.050)	ND (0.058)	6/13/84
2-MA-SV0-15-44	82-053	26.1	20.4 (78.2)	ND (1.0)	ND (0.038)	ND (0.049)	6/13/84
2-MA-SV0-45+	82-054	18.0	15.1 (83.9)	5.3	0.29	0.35	6/13/84
1-EN-SV0-0-14	82-055	18.1	8.8 (48.6)	ND (1.0)	ND (0.055)	ND (0.11)	4/25/84
1-EN-SV0-15-44	82-056	21.6	16.3 (75.5)	ND (1.0)	ND (0.046)	ND (0.061)	4/26/84
1-EN-SV0-45+	82-057	19.8	16.0 (80.6)	ND (1.0)	ND (0.051)	ND (0.063)	4/26/84
2-EN-SV0-0-14	82-058	21.2	14.7 (69.3)	ND (1.0)	ND (0.047)	ND (0.066)	6/14/84
2-EN-SV0-15-44	82-059	21.4	17.8 (83.2)	tr 3.3	tr 0.16	tr 0.19	6/14/84
2-EN-SV0-45+	82-060	26.2	21.8 (83.2)	tr 5.6	tr 0.21	tr 0.25	6/14/84
3-EN-SV0-45+	82-062	23.2	19.8 (85.3)	tr 3.9	tr 0.17	tr 0.20	6/15/84
1-WN-SV0-0-14	82-063	23.4	14.8 (63.1)	tr 1.9	tr 0.080	tr 0.13	5/10/84
1-WN-SV0-15-44	82-064	20.6	15.7 (76.2)	tr 2.2	tr 0.11	tr 0.14	5/11/84
1-WN-SV0-45+	82-065	22.5	20.2 (89.8)	7.7	0.34	0.38	5/10/84
2-WN-SV0-45+	82-066	21.4	17.2 (80.4)	ND (1.0)	ND (0.047)	ND (0.058)	6/15/84

Table 13 (continued)

Sample composite number	NRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%) ^a	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analysis date
1-SA-SVO-0-14	82-067	20.7	16.8 (83.9)	ND (1.0)	ND (0.048)	ND (0.058)	4/26/84
1-SA-SVO-15-44	82-068	26.4	22.8 (86.4)	ND (1.0)	ND (0.036)	ND (0.044)	4/24/84
1-SA-SVO-45+	82-069	20.0	16.5 (82.5)	tr 1.1	tr 0.053	tr 0.064	4/24/84
2-SA-SVO-0-14	82-070	19.1	13.2 (69.1)	ND (1.0)	ND (0.052)	ND (0.076)	6/15/84
2-SA-SVO-15-44	82-071	19.5	17.4 (89.3)	tr 2.31	tr 0.12	tr 0.13	6/14/84
2-SA-SVO-45+	82-072	26.1	21.9 (83.9)	5.9	0.23	0.27	6/13/84
3-SA-SVO-15-44	82-073	17.9	12.6 (70.4)	ND (1.0)	ND (0.056)	ND (0.079)	6/16/84
3-SA-SVO-45+	82-074	18.0	15.6 (86.7)	ND (1.0)	ND (0.056)	ND (0.064)	6/16/84
4-SA-SVO-15-44	82-075	18.2	13.1 (72.0)	ND (1.0)	ND (0.057)	ND (0.081)	6/18/84
4-SA-SVO-45+	82-076	17.6	12.4 (70.5)	ND (1.0)	ND (0.057)	ND (0.081)	6/18/84
1-ES-SVO-0-14	82-077	28.1	21.7 (77.2)	tr 3.1	tr 0.11	tr 0.14	5/14/84
1-ES-SVO-15-44	82-078	19.9	16.6 (83.2)	11	0.57	0.69	5/14/84
2-ES-SVO-15-44	82-080	25.7	22.5 (87.5)	ND (1.0)	ND (0.039)	ND (0.044)	6/15/84
2-ES-SVO-45+	82-081	21.1	16.5 (78.2)	ND (1.0)	ND (0.047)	ND (0.061)	6/16/84
1-WS-SVO-0-14	82-082	11.1	7.5 (67.6)	ND (1.0)	ND (0.090)	ND (0.13)	5/14/84
1-WS-SVO-15-44	82-083	22.7	19.7 (86.7)	tr 3.0	tr 0.13	tr 0.15	5/9/84
1-WS-SVO-45+	82-084	22.4	21.2 (94.6)	8.6	3.84	4.1	5/10/84
2-WS-SVO-15-44	82-085	21.9	18.9 (86.3)	ND (1.0)	ND (0.046)	ND (0.053)	6/15/84

^aThe estimated limit of detection (LOD) for this compound is 1.0 µg/sample ($2.5 \times S/N$). The estimated limit of quantitation for this compound is 4.0 µg/sample ($10 \times S/N$).

^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

b. Polychlorinated Biphenyls

Tables 14 to 22 summarize the data on PCBs. Table 14 presents total PCB data while Tables 15 to 22 detail the analytical results obtained for the trichloro- through decachloro-biphenyl homologs on a composite basis. The total PCB value includes the sum of all homolog data reported as trace values as well as the positive quantifiable data. The level of detail on the presence of PCBs in human adipose tissue determined by HRGC/MS presents a definite advantage over the PGC/ECD approach. The detection and quantitation of PCBs by the existing PGC/ECD method relies on the measurement of a single response peak at a specified retention time. The concentration of PCBs in human adipose tissue up to this point has been reported on a semiquantitative method via the PGC/ECD method. Data have been reported as not detected, or detected above or below a certain concentration value.

The determination of the PCBs by the HRGC/MS method described in this report provides (1) a quantitative measure of PCBs, (2) the distribution of PCBs by homolog, and (3) the potential to identify specific PCB homolog peaks that persist in the human adipose tissue. This distribution of PCB homologs or specific congeners provides the potential for identifying the source of exposure (e.g., specific Aroclor) and determining whether this source varies with geographical location. Figure 16 is an example of the HRGC/MS PCB data for the analysis of human adipose tissue. Figure 16 illustrates the responses for the predominant molecular ions for trichloro through octachlorobiphenyls. The peaks with the shaded area represent the responses that were noted as positive identifications within the specific PCB homolog.

c. Chlorinated Benzenes

Tables 23 to 25 present the analytical results for chlorobenzenes by the HRGC/MS method. Only hexachlorobenzene (HCB) had been included as a target analyte in previous NHATS analyses programs based on the PGC/ECD method.

Table 23 indicates that 1,2-dichlorobenzene was detected in only four of the composites analyzed (frequency of < 10%). A heated dynamic headspace analysis of adipose tissue for volatile organic compounds indicated that this compound was present at concentrations of approximately 0.001 µg/g in nearly 63% of the samples analyzed. As noted in Table 23, the estimated limit of detection for 1,2-dichlorobenzene by this analysis method is 0.010 µg/g for a 20-g sample. Trichlorobenzene (1,2,4-isomer) was also detected in a minimum number of samples, but the tetrachlorobenzene isomers and pentachlorobenzene were not detected in any of the composited tissue samples. The presence of pentachlorobenzene in adipose tissues has been reported (Mes, Davies, Turton 1985) at 0.001 µg/g, which is below the detection level of the HRGC/MS method described in this report.

Hexachlorobenzene (HCB) has been routinely included as one of the target pesticides in the analysis of the NHATS composite specimens by the PGC/ECD method. HCB was detected in 76% of the composite samples analyzed by the HRGC/MS method. As noted for the organochlorine pesticide, HCB has been detected at a higher frequency by the PGC/ECD method. Differences in the incidence of detection may be attributed to the respective method sensitivities.

Table 14. Data Report - Polychlorinated Biphenyls (CAS No. 1336-36-3) - FY82 Composite Adipose Tissue Samples

Sample composite number	MRI sample number	Wet tissue weight - g.	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (µg)	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)
1-MO-SVO-0-14	82-036	9.0	5.6 (62.3)	4/19/84	ND	ND (0.20)	ND (0.032)	ND (0.036)
1-MO-SVO-15-44	82-037	18.3	13.6 (74.1)	4/19/84	2	1.2	0.066	0.088
1-MO-SVO-45+	82-041	21.0	17.7 (84.3)	5/10/84	8	11	0.52	0.62
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	4/6/84	ND	ND (0.20)	ND (0.010)	ND (0.019)
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	4/5/84	7	2.0	0.091	0.10
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	4/15/84	5	3.4	0.13	0.16
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	4/19/84	ND	ND (0.20)	0.010	0.016
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	4/19/84	9	6.7	0.30	0.35
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	4/6/84	7	3.4	0.15	0.19
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	4/5/84	12	4.5	0.18	0.22
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	6/1/84	7	3.0	0.19	0.22
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	6/13/84	8	2.5	0.12	0.15
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	6/12/84	10	5.3	0.20	0.26
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	6/12/84	3	1.7	0.094	0.11
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	4/19/84	ND	ND (0.20)	ND (0.011)	ND (0.023)
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	4/20/84	5	1.1	0.051	0.067
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	4/20/84	1	0.30	0.015	0.019
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	6/5/84	ND	ND (0.20)	ND (0.009)	ND (0.014)
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	6/4/84	6	1.8	0.084	0.101
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	6/4/84	18	15	0.57	0.68
3-EN-SVO-15-44	82-061	20.2	16.8 (83.2)	6/5/84	5	1.3	0.065	0.077
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	6/6/84	13	7.5	0.32	0.38
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	5/7/84	6	1.6	0.068	0.11
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	5/4/84	12	5.8	0.28	0.37
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	5/7/84	21	17	0.76	0.84
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	6/5/84	9	3.0	0.14	0.17

Table 14 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (µg)	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)
1-SA-SVO-0-14	82-067	20.7	16.8 (83.9)	5/11/84	7	1.6	0.077	0.092
1-SA-SVO-15-44	82-068	26.4	22.8 (86.4)	4/20/84	9	3.3	0.13	0.14
1-SA-SVO-45+	82-069	20.0	16.5 (82.5)	4/20/84	10	2.7	0.14	0.16
2-SA-SVO-0-14	82-070	19.1	13.2 (69.1)	6/5/84	ND	ND (0.20)	ND	0.015
2-SA-SVO-15-44	82-071	19.5	17.4 (89.3)	6/18/84	8	6.1	0.31	0.35
2-SA-SVO-45+	82-072	26.1	21.9 (83.9)	6/4/84	13	14	0.54	0.64
3-SA-SVO-15-44	82-073	17.9	12.6 (70.4)	6/5/84	16	6.4	0.36	0.51
3-SA-SVO-45+	82-074	18.0	15.6 (86.7)	6/12/84	13	16	0.89	1.0
4-SA-SVO-15-44	82-075	18.2	13.1 (72.0)	6/6/84	8	4.0	0.22	0.31
4-SA-SVO-45+	82-076	17.6	12.4 (70.5)	6/12/84	18	21	1.2	1.7
1-ES-SVO-0-14	82-077	28.1	21.7 (77.2)	6/1/84	10	7.6	0.27	0.35
1-ES-SVO-15-44	82-078	19.9	16.6 (83.2)	5/10/84	19	18	0.90	1.1
1-ES-SVO-45+	82-079	20.7	18.3 (88.4)	5/10/84	7	3.3	0.16	0.18
2-ES-SVO-45+	82-081	21.1	16.5 (78.2)	6/6/84	16	25	1.2	1.5
1-MS-SVO-0-14	82-082	11.1	7.5 (67.6)	5/8/84	2	0.97	0.087	0.13
1-MS-SVO-15-44	82-083	22.7	19.7 (86.7)	5/4/84	11	4.4	0.19	0.22
1-MS-SVO-45+	82-084	22.4	21.2 (94.6)	5/7/84	15	6.7	0.30	0.32
2-MS-SVO-15-44	82-085	21.9	18.9 (86.3)	6/18/84	2	0.70	0.32	0.037

Table 15. Data Report - Trichlorobiphenyl (CAS No. 25323-68-6) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)
1-MD-SVO-0-14	82-036	9.0	5.6 (62.3)	4/19/84	ND	ND (0.20)	ND (0.022)	ND (0.036)
1-MD-SVO-15-44	82-037	18.3	13.6 (74.1)	4/19/84	ND	ND (0.20)	ND (0.011)	ND (0.015)
1-MD-SVO-45+	82-041	21.0	17.7 (84.3)	5/10/84	ND	ND (0.20)	ND (0.010)	ND (0.011)
1-NF-SVO-0-14	82-042	19.1	10.5 (55.1)	4/6/84	ND	ND (0.20)	ND (0.010)	ND (0.019)
1-NF-SVO-15-44	82-043	21.9	19.2 (87.6)	4/5/84	ND	ND (0.20)	ND (0.009)	ND (0.010)
1-NF-SVO-45+	82-044	26.7	21.1 (79.2)	4/5/84	ND	ND (0.20)	ND (0.007)	ND (0.009)
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	4/19/84	ND	ND (0.20)	ND (0.010)	ND (0.016)
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	4/19/84	ND	ND (0.20)	ND (0.009)	ND (0.010)
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	4/6/84	ND	ND (0.20)	ND (0.009)	ND (0.011)
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	4/5/84	ND	ND (0.20)	ND (0.008)	ND (0.010)
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	6/1/84	ND	ND (0.20)	ND (0.012)	ND (0.015)
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	6/12/84	ND	ND (0.20)	ND (0.010)	ND (0.012)
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	6/12/84	ND	ND (0.20)	ND (0.008)	ND (0.010)
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	6/12/84	ND	ND (0.20)	ND (0.011)	ND (0.013)
1-EN-SVO-0-14	82-055	18.1	8.8 (48.5)	4/19/84	ND	ND (0.20)	ND (0.011)	ND (0.023)
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	4/20/84	ND	ND (0.20)	ND (0.009)	ND (0.012)
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	4/20/84	1	tr 0.30	tr 0.015	tr 0.019
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	6/5/84	ND	ND (0.20)	ND (0.009)	ND (0.014)
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	6/4/84	ND	ND (0.20)	ND (0.010)	ND (0.012)
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	6/4/84	1	tr 0.40	tr 0.015	tr 0.018
3-EN-SVO-15-44	82-061	20.2	16.8 (83.2)	6/5/84	ND	ND (0.20)	ND (0.010)	ND (0.012)
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	6/6/84	1	tr 0.28	tr 0.012	tr 0.014
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	5/7/84	ND	ND (0.20)	ND (0.014)	ND (0.021)
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	5/4/84	ND	ND (0.20)	ND (0.010)	ND (0.013)
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	5/7/84	1	tr 0.49	tr 0.022	tr 0.024
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	6/5/84	ND	ND (0.20)	ND (0.009)	ND (0.012)

Table 15 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	5/11/84	ND	ND (0.20)	ND (0.010)	ND (0.012)
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	4/20/84	ND	ND (0.20)	ND (0.008)	ND (0.009)
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	4/20/84	1	tr 0.38	tr 0.019	tr 0.023
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	6/5/84	ND	ND (0.20)	ND (0.010)	ND (0.015)
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	6/18/84	1	tr 0.20	tr 0.010	tr 0.011
2-SA-SV0-45+	82-072	26.1	21.9 (83.9)	6/4/84	1	tr 0.20	tr 0.008	tr 0.009
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	6/5/84	ND	ND (0.20)	ND (0.011)	ND (0.016)
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	6/12/84	ND	ND (0.20)	ND (0.011)	ND (0.013)
4-SA-SV0-15-44	82-075	18.2	13.1 (72.0)	6/6/84	ND	ND (0.20)	ND (0.011)	ND (0.015)
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	6/12/84	1	tr 0.41	tr 0.023	tr 0.033
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	6/1/84	1	tr 0.20	tr 0.007	tr 0.009
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	5/10/84	ND	ND (0.20)	ND (0.010)	ND (0.012)
1-ES-SV0-45+	82-079	20.7	18.3 (88.4)	5/10/84	ND	ND (0.20)	ND (0.010)	ND (0.011)
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	6/6/84	ND	ND (0.20)	ND (0.009)	ND (0.012)
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	5/8/84	ND	ND (0.20)	ND (0.018)	ND (0.027)
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	5/4/84	ND	ND (0.20)	ND (0.009)	ND (0.010)
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	5/7/84	1	tr 0.42	tr 0.019	tr 0.020
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	6/18/84	ND	ND (0.20)	ND (0.009)	ND (0.011)

a. The estimated limit of detection (LOD) for this compound is 0.20 μg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LQQ) for this compound is 0.80 μg/sample ($10 \times S/N$).

b. ND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LQQ.

Table 16. Data Report - Tetrachlorobiphenyl (CAS No. 26914-33-0) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)
1-MO-SVO-0-14	82-036	9.0	5.6 (62.3)	4/19/84	ND	ND (0.20)	ND (0.022)	ND (0.036)
1-MO-SVO-15-44	82-037	18.3	13.6 (74.1)	4/19/84	ND	ND (0.20)	ND (0.011)	ND (0.015)
1-MO-SVO-45+	82-041	21.0	17.7 (84.3)	5/10/84	1	tr 0.44	tr 0.021	tr 0.025
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	4/6/84	ND	ND (0.20)	ND (0.010)	ND (0.019)
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	4/5/84	1	tr 0.36	tr 0.016	tr 0.018
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	4/15/84	1	tr 0.23	tr 0.009	tr 0.011
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	4/19/84	ND	ND (0.20)	ND (0.010)	ND (0.016)
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	4/19/84	ND	ND (0.20)	ND (0.045)	ND (0.052)
1-VA-SVO-0-14	82-049	23.0	17.8 (77.5)	4/6/84	1	tr 0.51	tr 0.022	tr 0.028
1-VA-SVO-15-44	82-050	25.2	20.3 (80.7)	4/5/84	1	tr 0.63	tr 0.025	tr 0.031
1-VA-SVO-45+	82-051	16.2	13.4 (82.5)	6/1/84	1	tr 0.50	tr 0.031	tr 0.037
2-VA-SVO-0-14	82-052	20.2	17.1 (84.7)	6/13/84	3	tr 0.39	tr 0.019	tr 0.023
2-VA-SVO-15-44	82-053	26.1	20.4 (78.2)	6/12/84	3	tr 0.39	tr 0.015	tr 0.019
2-VA-SVO-45+	82-054	18.0	15.1 (83.9)	6/12/84	ND	ND (0.20)	ND (0.011)	ND (0.013)
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	4/19/84	ND	ND (0.20)	ND (0.011)	ND (0.023)
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	4/20/84	ND	ND (0.20)	ND (0.009)	ND (0.012)
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	4/20/84	ND	ND (0.20)	ND (0.010)	ND (0.013)
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	6/5/84	ND	ND (0.20)	ND (0.009)	ND (0.014)
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	6/4/84	1	tr 0.22	tr 0.010	tr 0.012
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	6/4/84	1	tr 0.90	tr 0.034	tr 0.041
3-EN-SVO-15-44	82-061	20.2	16.8 (83.2)	6/5/84	ND	ND (0.20)	ND (0.010)	ND (0.012)
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	6/6/84	1	tr 0.74	tr 0.032	tr 0.037
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	5/7/84	ND	ND (0.20)	ND (0.009)	ND (0.014)
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	5/4/84	1	tr 0.48	tr 0.023	tr 0.031
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	5/7/84	1	tr 1.1	tr 0.049	tr 0.055
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	6/5/84	1	tr 0.25	tr 0.012	tr 0.015

Table 16 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (μg)	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)
1-SA-SVO-0-14	82-067	20.7	16.8 (83.9)	5/11/84	ND	ND (0.20)	ND (0.010)	ND (0.012)
1-SA-SVO-15-44	82-068	26.4	22.8 (86.4)	4/20/84	ND	ND (0.20)	ND (0.008)	ND (0.009)
1-SA-SVO-45+	82-069	20.0	16.5 (82.5)	4/20/84	ND	ND (0.20)	ND (0.010)	ND (0.012)
2-SA-SVO-0-14	82-070	19.1	13.2 (69.1)	6/5/84	ND	ND (0.20)	ND (0.010)	ND (0.015)
2-SA-SVO-15-44	82-071	19.5	17.4 (89.3)	6/18/84	1	tr 0.76	tr 0.039	tr 0.044
2-SA-SVO-45+	82-072	26.1	21.9 (83.9)	6/4/84	1	0.98	0.038	0.045
3-SA-SVO-15-44	82-073	17.9	12.6 (70.4)	6/5/84	1	tr 0.24	tr 0.013	tr 0.019
3-SA-SVO-45+	82-074	18.0	15.6 (86.7)	6/12/84	1	tr 0.72	tr 0.040	tr 0.046
4-SA-SVO-15-44	82-075	18.2	13.1 (72.0)	6/6/84	1	tr 0.36	tr 0.020	tr 0.027
4-SA-SVO-45+	82-076	17.6	12.4 (70.5)	6/12/84	2	1.2	0.066	0.093
1-ES-SVO-0-14	82-077	28.1	21.7 (77.2)	6/1/84	ND	ND (0.20)	ND (0.007)	ND (0.009)
1-ES-SVO-15-44	82-078	19.9	16.6 (83.2)	5/10/84	1	tr 0.68	tr 0.034	tr 0.041
1-ES-SVO-45+	82-079	20.7	18.3 (88.4)	5/10/84	ND	ND (0.20)	ND (0.010)	ND (0.011)
2-ES-SVO-45+	82-081	21.1	16.5 (78.2)	6/6/84	1	tr 0.78	tr 0.037	tr 0.047
1-WS-SVO-0-14	82-082	11.1	7.5 (67.6)	5/8/84	ND	ND (0.20)	ND (0.018)	ND (0.027)
1-WS-SVO-15-44	82-083	22.7	19.7 (86.7)	5/4/84	1	tr 0.35	tr 0.015	tr 0.018
1-WS-SVO-45+	82-084	22.4	21.2 (94.6)	5/7/84	1	tr 0.48	tr 0.021	tr 0.023
2-WS-SVO-15-44	82-085	21.9	18.9 (86.3)	6/18/84	ND	ND (0.20)	ND (0.009)	ND (0.011)

^aThe estimated limit of detection (LOD) for this compound is 0.20 μg/sample (2.5 × S/N). The estimated limit of quantitation (LOQ) for this compound is 0.80 μg/sample (10 × S/N).

^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

Table 17. Data Report - Pentachlorobiphenyl (CAS No. 25429-29-2) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (pg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)
1-MO-SVO-0-14	82-036	9.0	5.6 (62.3)	4/19/84	ND	ND (0.40)	ND (0.044)	ND (0.071)
1-MO-SVO-15-44	82-037	18.3	13.6 (74.1)	4/19/84	ND	ND (0.40)	ND (0.022)	ND (0.029)
1-WO-SVO-45+	82-041	21.0	17.7 (84.3)	5/10/84	1	ND (0.40)	ND (0.022)	0.13
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	4/6/84	ND	ND (0.40)	ND (0.021)	ND (0.038)
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	4/5/84	2	tr 0.46	tr 0.021	tr 0.024
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	4/15/84	3	tr 2.7	0.10	0.13
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	4/19/84	ND	ND (0.40)	ND (0.020)	ND (0.032)
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	4/19/84	2	tr 0.71	tr 0.032	tr 0.037
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	4/6/84	5	tr 1.3	tr 0.056	tr 0.072
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	4/5/84	5	tr 1.4	tr 0.055	tr 0.068
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	6/7/84	3	tr 1.1	tr 0.068	tr 0.082
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	6/13/84	2	tr 0.70	tr 0.035	tr 0.041
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	6/12/84	4	tr 2.1	tr 0.080	0.10
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	6/12/84	1	tr 1.2	tr 0.068	tr 0.081
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	4/19/84	ND	ND (0.40)	ND (0.022)	ND (0.045)
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	4/20/84	ND	ND (0.40)	ND (0.19)	ND (0.025)
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	4/20/84	ND	ND (0.40)	ND (0.020)	ND (0.025)
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	6/5/84	ND	ND (0.40)	ND (0.019)	ND (0.027)
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	6/4/84	3	tr 0.56	tr 0.026	tr 0.031
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	6/4/84	3	tr 2.4	tr 0.092	0.11
3-EN-SVO-15-44	82-061	20.2	16.8 (83.2)	6/5/84	3	tr 0.48	tr 0.024	tr 0.029
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	6/6/84	2	tr 1.4	tr 0.061	tr 0.072
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	5/7/84	3	tr 0.62	tr 0.026	tr 0.042
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	5/4/84	2	tr 0.98	tr 0.048	tr 0.062
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	5/7/84	3	3.2	0.14	0.16
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	6/5/84	3	tr 0.83	tr 0.039	tr 0.048

Table 17 (continued)

Sample composite number	NRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	5/11/84	4	tr	0.59	tr 0.034
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	4/20/84	3	tr	1.3	tr 0.057
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	4/20/84	2	ND	0.60	0.036
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	6/5/84	ND (0.40)	ND (0.021)	ND (0.021)	ND (0.021)
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	6/18/84	3	1.6	0.084	0.094
2-SA-SV0-45+	82-072	26.1	21.9 (83.9)	6/4/84	2	2.3	0.088	0.11
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	6/5/84	5	tr	1.1	tr 0.061
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	6/12/84	4	4.6	0.25	0.087
4-SA-SV0-15-44	82-075	18.2	13.1 (72.0)	6/6/84	1	tr	0.86	0.29
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	6/12/84	2	2.3	0.047	0.66
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	6/1/84	ND	ND (0.40)	ND (0.018)	ND (0.024)
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	5/10/84	5	4.4	0.22	0.27
1-ES-SV0-45+	82-079	20.7	18.3 (88.4)	5/10/84	2	tr	1.2	tr 0.056
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	6/5/84	3	2.8	0.13	0.063
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	5/8/84	ND	ND (0.40)	ND (0.036)	ND (0.053)
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	5/4/84	3	tr	0.88	tr 0.039
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	5/7/84	2	tr	0.86	tr 0.038
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	6/18/84	ND	ND (0.40)	ND (0.18)	ND (0.021)

a The estimated limit of detection (LOD) for this compound is 0.40 μg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LOQ) for this compound is 1.6 μg/sample ($10 \times S/N$).
 b ND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

Table 18. Data Report - Hexachlorobiphenyl (CAS No. 26601-64-9) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)
1-MO-SVO-0-14	82-036	9.0	5.6 (62.3)	4/19/84	ND	ND (0.40)	ND (0.044)	ND (0.071)
1-MO-SVO-15-44	82-037	18.3	13.6 (74.1)	4/19/84	2	tr 1.2	tr 0.067	tr 0.090
1-MO-SVO-45+	82-041	21.0	17.7 (84.3)	5/10/84	3	tr 4.8	tr 0.23	tr 0.27
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	4/6/84	ND	ND (0.40)	ND (0.021)	ND (0.038)
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	4/5/84	4	tr 1.2	tr 0.056	tr 0.064
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	4/15/84	ND	ND (0.40)	ND (0.015)	ND (0.019)
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	4/19/84	ND	ND (0.40)	ND (0.020)	ND (0.032)
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	4/19/84	1	tr 0.44	tr 0.020	tr 0.023
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	4/6/84	1	1.6	0.071	0.092
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	4/5/84	3	2.0	0.078	0.097
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	6/1/84	3	tr 1.4	tr 0.086	tr 0.10
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	6/13/84	3	tr 1.4	tr 0.069	tr 0.081
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	6/12/84	3	2.8	0.11	0.14
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	6/12/84	2	tr 0.48	tr 0.027	tr 0.032
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	4/19/84	ND	ND (0.40)	ND (0.022)	ND (0.045)
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	4/20/84	ND	ND (0.40)	ND (0.019)	ND (0.025)
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	4/20/84	ND	ND (0.40)	ND (0.020)	ND (0.025)
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	6/5/84	ND	ND (0.40)	ND (0.019)	ND (0.027)
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	6/4/84	2	tr 1.0	tr 0.048	tr 0.057
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	6/4/84	3	5.4	0.21	0.25
3-EN-SVO-0-14	82-061	20.2	16.8 (83.2)	6/5/84	2	tr 0.80	tr 0.040	tr 0.048
3-EN-SVO-15-44	82-062	23.2	19.8 (85.3)	6/6/84	2	2.8	0.12	0.14
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	5/7/84	3	tr 1.0	tr 0.043	tr 0.068
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	5/4/84	2	2.7	0.13	0.17
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	5/7/84	4	6.4	0.29	0.32
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	6/5/84	2	tr 1.3	tr 0.059	tr 0.073

Table 18 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	5/11/84	3	tr	0.98	tr 0.047
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	4/20/84	3	tr	0.42	tr 0.016
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	4/20/84	ND (0.40)	ND (0.020)	ND (0.024)	ND (0.030)
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	6/5/84	ND	ND (0.021)	ND	ND (0.021)
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	6/18/84	2	3.0	0.16	0.18
2-SA-SV0-45+	82-072	26.1	21.9 (83.9)	6/4/84	2	4.5	0.17	0.21
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	6/5/84	2	2.6	0.15	0.21
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	6/12/84	4	7.0	0.39	0.45
4-SA-SV0-15-44	82-075	18.2	13.1 (72.0)	6/6/84	3	2.0	0.11	0.15
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	6/12/84	3	4.4	0.25	0.35
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	6/1/84	2	4.5	0.16	0.21
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	5/10/84	4	7.2	0.36	0.44
1-ES-SV0-45+	82-079	20.7	18.3 (88.4)	5/10/84	ND (0.40)	ND (0.019)	ND (0.019)	ND (0.022)
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	6/6/84	2	8.6	0.41	0.52
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	5/8/84	1	tr	0.45	tr 0.041
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	5/4/84	3	2.2	0.098	tr 0.061
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	5/7/84	3	2.7	0.12	0.11
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	6/18/84	2	tr	0.70	tr 0.032
						tr	0.037	

^aThe estimated limit of detection (LOD) for this compound is 0.40 μg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LOQ) for this compound is 1.6 μg/sample ($10 \times S/N$).
^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

Table 19. Data Report - Heptachlorobiphenyl (CAS No. 28655-71-2) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)
1-MO-SV0-0-14	82-036	9.0	5.6 (62.3)	4/19/84	ND	ND (0.40)	ND (0.044)	ND (0.071)
1-MO-SV0-15-44	82-037	18.3	13.6 (74.1)	4/19/84	ND	ND (0.40)	ND (0.022)	ND (0.030)
1-MO-SV0-45+	82-041	21.0	17.7 (84.3)	5/10/84	3	3.3	0.16	0.19
1-NE-SV0-0-14	82-042	19.1	10.5 (55.1)	4/6/84	ND	ND (0.40)	ND (0.021)	ND (0.038)
1-NE-SV0-15-44	82-043	21.9	19.2 (87.6)	4/5/84	ND	ND (0.40)	ND (0.018)	ND (0.021)
1-NE-SV0-45+	82-044	26.7	21.1 (79.2)	4/15/84	ND	ND (0.40)	ND (0.015)	ND (0.019)
1-PA-SV0-0-14	82-046	19.7	12.4 (62.9)	4/19/84	ND	ND (0.40)	ND (0.020)	ND (0.032)
1-PA-SV0-45+	82-048	22.0	19.2 (87.1)	4/19/84	2	2.8	0.13	0.14
1-MA-SV0-0-14	82-049	23.0	17.8 (77.5)	4/6/84	ND	ND (0.40)	ND (0.017)	ND (0.022)
1-MA-SV0-15-44	82-050	25.2	20.3 (80.7)	4/5/84	3	tr 0.46	tr 0.018	tr 0.023
1-MA-SV0-45+	82-051	16.2	13.4 (82.5)	6/1/84	ND	ND (0.40)	ND (0.027)	ND (0.030)
2-MA-SV0-0-14	82-052	20.2	17.1 (84.7)	6/13/84	ND	ND (0.40)	ND (0.020)	ND (0.023)
2-MA-SV0-15-44	82-053	26.1	20.4 (78.2)	6/12/84	ND	ND (0.40)	ND (0.015)	ND (0.020)
2-MA-SV0-45+	82-054	18.0	15.1 (83.9)	6/12/84	ND	ND (0.40)	ND (0.022)	ND (0.026)
1-EN-SV0-0-14	82-055	18.1	8.8 (48.6)	4/19/84	ND	ND (0.40)	ND (0.066)	ND (0.14)
1-EN-SV0-15-44	82-056	21.6	16.3 (75.5)	4/20/84	2	0.65	0.03	0.040
1-EN-SV0-45+	82-057	19.8	16.0 (80.6)	4/20/84	ND	ND (0.40)	ND (0.022)	ND (0.027)
2-EN-SV0-0-14	82-058	21.2	14.7 (69.3)	6/5/84	ND	ND (0.40)	ND (0.019)	ND (0.027)
2-EN-SV0-15-44	82-059	21.4	17.8 (83.2)	6/4/84	ND	ND (0.40)	ND (0.019)	ND (0.022)
2-EN-SV0-45+	82-060	26.2	21.8 (83.2)	6/4/84	4	2.6	0.099	0.12
3-EN-SV0-15-44	82-061	20.2	16.8 (83.2)	6/5/84	ND	ND (0.40)	ND (0.020)	ND (0.024)
3-EN-SV0-45+	82-062	23.2	19.8 (85.3)	6/6/84	3	1.8	0.078	0.092
1-WN-SV0-0-14	82-063	23.4	14.8 (63.1)	5/7/84	ND	ND (0.40)	ND (0.017)	ND (0.027)
1-WN-SV0-15-44	82-064	20.6	15.7 (76.2)	5/4/84	4	tr 1.2	tr 0.057	tr 0.075
1-WN-SV0-45+	82-065	22.5	20.2 (89.8)	5/7/84	6	3.5	0.16	0.18
2-WN-SV0-45+	82-066	21.4	17.2 (80.4)	6/5/84	3	tr 0.65	tr 0.030	tr 0.034

Table 19 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	5/11/84	ND	ND (0.40)	ND (0.019)	ND (0.023)
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	4/20/84	3	1.6	0.061	0.070
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	4/20/84	4	0.83	tr 0.041	tr 0.050
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	6/5/84	ND	ND (0.40)	ND (0.021)	ND (0.030)
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	6/18/84	1	0.50	tr 0.026	tr 0.029
2-SA-SV0-45+	82-072	26.1	21.9 (83.9)	6/4/84	4	tr 2.3	tr 0.090	tr 0.11
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	6/5/84	4	tr 1.5	tr 0.082	tr 0.12
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	6/12/84	2	2.5	0.14	0.16
4-SA-SV0-15-44	82-075	18.2	13.1 (72.0)	6/6/84	3	tr 0.78	tr 0.043	tr 0.060
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	6/12/84	4	1.9	0.11	0.16
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	6/1/84	4	1.8	0.065	0.084
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	5/10/84	4	3.2	0.16	0.19
1-ES-SV0-45+	82-079	20.7	18.3 (88.4)	5/10/84	1	tr 0.42	tr 0.020	tr 0.023
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	6/6/84	4	6.4	0.30	0.39
1-W5-SV0-0-14	82-082	11.1	7.5 (67.6)	5/8/84	ND	ND (0.40)	ND (0.036)	ND (0.053)
1-W5-SV0-15-44	82-083	22.7	19.7 (86.7)	5/4/84	4	tr 0.96	tr 0.042	tr 0.049
1-W5-SV0-45+	82-084	22.4	21.2 (94.6)	5/7/84	4	tr 1.5	tr 0.066	tr 0.070
2-W5-SV0-15-44	82-085	21.9	18.9 (86.3)	6/18/84	ND	ND (0.40)	ND (0.018)	ND (0.021)

^aThe estimated limit of detection (LOD) for this compound is 0.40 μg/sample (2.5 × S/N). The estimated limit of quantitation (LOQ) for this compound is 1.6 μg/sample (10 × S/N).
^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

Table 20. Data Report - Octachlorobiphenyl (CAS No. 31472-83-0) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	NRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (µg)	Concentration - wet tissue (µg/g) ^b	Concentration - extractable lipid (µg/g)
1-MO-SV0-0-14	82-036	9.0	5.6 (62.3)	4/19/84	ND	ND (0.40)	ND (0.044)	ND (0.071)
1-MO-SV0-15-44	82-037	18.3	13.6 (74.1)	4/19/84	ND	ND (0.40)	ND (0.22)	ND (0.029)
1-MO-SV0-45+	82-041	21.0	17.7 (84.3)	5/10/84	ND	ND (0.40)	ND (0.19)	ND (0.023)
1-NE-SV0-0-14	82-042	19.1	10.5 (55.1)	4/6/84	ND	ND (0.40)	ND (0.021)	ND (0.038)
1-NE-SV0-15-44	82-043	21.9	19.2 (87.6)	4/5/84	ND	ND (0.40)	ND (0.18)	ND (0.021)
1-NE-SV0-45+	82-044	26.7	21.1 (79.2)	4/15/84	1	tr 0.43	tr 0.016	tr 0.020
1-PA-SV0-0-14	82-045	19.7	12.4 (62.9)	4/19/84	ND	ND (0.40)	ND (0.020)	ND (0.032)
1-PA-SV0-45+	82-048	22.0	19.2 (87.1)	4/19/84	3	2.2	0.10	0.12
1-MA-SV0-0-14	82-049	23.0	17.8 (77.5)	4/6/84	ND	ND (0.40)	ND (0.017)	ND (0.022)
1-MA-SV0-15-44	82-050	25.2	20.3 (80.7)	4/5/84	ND	ND (0.40)	ND (0.16)	ND (0.020)
1-MA-SV0-45+	82-051	16.2	13.4 (82.5)	6/1/84	ND	ND (0.40)	ND (0.25)	ND (0.030)
2-MA-SV0-0-14	82-052	20.2	17.1 (84.7)	6/13/84	ND	ND (0.40)	ND (0.020)	ND (0.023)
2-MA-SV0-15-44	82-053	26.1	20.4 (78.2)	6/12/84	ND	ND (0.40)	ND (0.15)	ND (0.020)
2-MA-SV0-45+	82-054	18.0	15.1 (83.9)	6/12/84	ND	ND (0.40)	ND (0.022)	ND (0.026)
1-EN-SV0-0-14	82-055	18.1	8.8 (48.6)	4/19/84	ND	ND (0.40)	ND (0.022)	ND (0.045)
1-EN-SV0-15-44	82-056	21.6	16.3 (75.5)	4/20/84	3	0.49	0.023	0.030
1-EN-SV0-45+	82-057	19.8	16.0 (80.6)	4/20/84	ND	ND (0.40)	ND (0.025)	ND (0.031)
2-EN-SV0-0-14	82-058	21.2	14.7 (69.3)	6/5/84	ND	ND (0.40)	ND (0.019)	ND (0.027)
2-EN-SV0-15-44	82-059	21.4	17.8 (83.2)	6/4/84	ND	ND (0.40)	ND (0.019)	ND (0.022)
2-EN-SV0-45+	82-060	26.2	21.8 (83.2)	6/4/84	5	1.6	0.061	0.073
3-EN-SV0-15-44	82-061	20.2	16.8 (83.2)	6/5/84	ND	ND (0.40)	ND (0.020)	ND (0.024)
3-EN-SV0-45+	82-062	23.2	19.8 (85.3)	6/6/84	4	tr 1.4	tr 0.062	tr 0.073
1-WN-SV0-0-14	82-063	23.4	14.8 (63.1)	5/7/84	ND	ND (0.40)	ND (0.017)	ND (0.027)
1-WN-SV0-15-44	82-064	20.6	15.7 (76.2)	5/4/84	3	tr 0.46	tr 0.022	tr 0.029
1-WN-SV0-45+	82-065	22.5	20.2 (89.8)	5/7/84	4	tr 1.5	tr 0.066	tr 0.074
2-WN-SV0-45+	82-066	21.4	17.2 (80.4)	6/5/84	ND	ND (0.40)	ND (0.019)	ND (0.023)

Table 20 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g) ^b	Concentration - extractable lipid (µg/g)
1-SA-SVO-0-14	82-067	20.7	16.8 (83.9)	5/11/84	ND	ND (0.40)	ND (0.019)	ND (0.023)
1-SA-SVO-15-44	82-068	26.4	22.8 (86.4)	4/20/84	ND	ND (0.40)	ND (0.015)	ND (0.018)
1-SA-SVO-45+	82-069	20.0	16.5 (82.5)	4/20/84	3	tr 0.87	tr 0.044	tr 0.053
2-SA-SVO-0-14	82-070	19.1	13.2 (69.1)	6/5/84	ND	ND (0.40)	ND (0.021)	ND (0.030)
2-SA-SVO-15-44	82-071	19.5	17.4 (89.3)	6/18/84	ND	ND (0.40)	ND (0.021)	ND (0.023)
2-SA-SVO-45+	82-072	26.1	21.9 (83.9)	6/4/84	2	tr 1.0	tr 0.039	tr 0.046
3-SA-SVO-15-44	82-073	17.9	12.6 (70.4)	6/5/84	4	tr 0.92	tr 0.051	tr 0.073
3-SA-SVO-45+	82-074	18.0	15.6 (86.7)	6/12/84	2	tr 0.70	tr 0.039	tr 0.045
4-SA-SVO-15-44	82-075	18.2	13.1 (72.0)	6/6/84	ND	ND (0.40)	ND (0.022)	ND (0.031)
4-SA-SVO-45+	82-076	17.6	12.4 (70.5)	6/12/84	3	4.9	0.28	0.39
1-ES-SVO-0-14	82-077	28.1	21.7 (77.2)	6/1/84	3	tr 1.1	tr 0.038	tr 0.049
1-ES-SVO-15-44	82-078	19.9	16.6 (83.2)	5/10/84	3	tr 1.7	tr 0.084	tr 0.10
1-ES-SVO-45+	82-079	20.7	18.3 (88.4)	5/10/84	3	tr 1.3	tr 0.061	tr 0.069
2-ES-SVO-45+	82-081	21.1	16.5 (78.2)	6/6/84	5	5.2	0.25	0.32
1-WS-SVO-0-14	82-082	11.1	7.5 (67.6)	5/8/84	1	tr 0.52	tr 0.047	tr 0.069
1-WS-SVO-15-44	82-083	22.7	19.7 (86.7)	5/4/84	ND (0.40)	ND (0.018)	ND (0.020)	tr 0.034
1-WS-SVO-45+	82-084	22.4	21.2 (94.6)	5/7/84	4	tr 0.71	tr 0.032	ND (0.018)
2-WS-SVO-15-44	82-085	21.9	18.9 (86.3)	6/18/84	ND	ND (0.40)	ND (0.021)	ND (0.021)

^aThe estimated limit of detection (LOD) for this compound is 0.40 µg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LQ) for this compound is 1.6 µg/sample ($10 \times S/N$).
^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LQ.

Table 21. Data Report - Nonachlorobiphenyl (CAS No. 53742-07-7) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (ug) ^b	Concentration - wet tissue (ug/g)	Concentration - extractable lipid (ug/g)
1-M0-SVO-0-14	82-036	9.0	5.6 (62.3)	4/19/84	ND	ND (0.40)	ND (0.044)	ND (0.070)
1-M0-SVO-15-44	82-037	18.3	13.6 (74.1)	4/19/84	ND	ND (0.40)	ND (0.022)	ND (0.029)
1-M0-SVO-45+	82-041	21.0	17.7 (84.3)	5/10/84	ND	ND (0.40)	ND (0.019)	ND (0.023)
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	4/6/84	ND	ND (0.40)	ND (0.021)	ND (0.038)
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	4/5/84	ND	ND (0.40)	ND (0.018)	ND (0.021)
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	4/15/84	ND	ND (0.40)	ND (0.015)	ND (0.019)
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	4/19/84	ND	ND (0.40)	ND (0.020)	ND (0.032)
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	4/19/84	1	tr 0.56	tr 0.025	tr 0.029
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	4/6/84	ND	ND (0.40)	ND (0.017)	ND (0.022)
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	4/5/84	ND	ND (0.40)	ND (0.016)	ND (0.020)
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	6/1/84	ND	ND (0.40)	ND (0.025)	ND (0.030)
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	6/13/84	ND	ND (0.40)	ND (0.020)	ND (0.023)
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	6/12/84	ND	ND (0.40)	ND (0.015)	ND (0.020)
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	6/12/84	ND	ND (0.40)	ND (0.022)	ND (0.026)
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	4/19/84	ND	ND (0.40)	ND (0.022)	ND (0.045)
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	4/20/84	ND	ND (0.40)	ND (0.019)	ND (0.025)
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	4/20/84	ND	ND (0.40)	ND (0.020)	ND (0.025)
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	6/5/84	ND	ND (0.40)	ND (0.019)	ND (0.027)
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	6/4/84	ND	ND (0.40)	ND (0.019)	ND (0.022)
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	6/4/84	ND	ND (0.40)	ND (0.015)	ND (0.018)
3-EN-SVO-15-44	82-061	20.2	16.8 (83.2)	6/5/84	ND	ND (0.40)	ND (0.020)	ND (0.024)
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	6/5/84	ND	ND (0.40)	ND (0.017)	ND (0.020)
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	5/7/84	ND	ND (0.40)	ND (0.017)	ND (0.027)
1-WN-SVO-15-44	82-064	20.6	15.8 (76.2)	5/4/84	ND	ND (0.40)	ND (0.019)	ND (0.025)
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	5/7/84	2	tr 0.52	tr 0.023	tr 0.026
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	6/5/84	ND	ND (0.40)	ND (0.019)	ND (0.023)

Table 21 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)
1-SA-SVO-0-14	82-067	20.7	16.8 (83.9)	5/11/84	ND	ND (0.40)	ND (0.019)	ND (0.024)
1-SA-SVO-15-44	82-068	26.4	22.8 (86.4)	4/20/84	ND	ND (0.40)	ND (0.015)	ND (0.018)
1-SA-SVO-45+	82-069	20.0	16.5 (82.5)	4/20/84	ND	ND (0.40)	ND (0.020)	ND (0.024)
2-SA-SVO-0-14	82-070	19.1	13.2 (69.1)	6/5/84	ND	ND (0.40)	ND (0.021)	ND (0.030)
2-SA-SVO-15-44	82-071	19.5	17.4 (89.3)	6/18/84	ND	ND (0.40)	ND (0.021)	ND (0.023)
2-SA-SVO-45+	82-072	26.1	21.9 (83.9)	6/4/84	ND	ND (0.40)	ND (0.015)	ND (0.018)
3-SA-SVO-15-44	82-073	17.9	12.6 (70.4)	6/5/84	ND	ND (0.40)	ND (0.022)	ND (0.031)
3-SA-SVO-45+	82-074	18.0	15.6 (86.7)	6/12/84	ND	ND (0.40)	ND (0.022)	ND (0.026)
4-SA-SVO-15-44	82-075	18.2	13.1 (72.0)	6/6/84	ND	ND (0.40)	ND (0.022)	ND (0.031)
4-SA-SVO-45+	82-076	17.6	12.4 (70.5)	6/12/84	2	3.8	0.21	0.30
1-ES-SVO-0-14	82-077	28.1	21.7 (77.2)	6/1/84	ND	ND (0.40)	ND (0.014)	ND (0.018)
1-ES-SVO-15-44	82-078	19.9	16.6 (83.2)	5/10/84	2	tr 0.68	tr 0.034	tr 0.041
1-ES-SVO-45+	82-079	20.7	18.3 (88.4)	5/10/84	1	tr 0.40	tr 0.019	tr 0.022
2-ES-SVO-45+	82-081	21.1	16.5 (78.2)	6/6/84	1	tr 1.1	tr 0.051	tr 0.065
1-WS-SVO-0-14	82-082	11.1	7.5 (67.6)	5/8/84	ND	ND (0.40)	ND (0.036)	ND (0.053)
1-WS-SVO-15-44	82-083	22.7	19.7 (86.7)	5/4/84	ND	ND (0.40)	ND (0.018)	ND (0.020)
1-WS-SVO-45+	82-084	22.4	21.2 (94.6)	5/7/84	ND	ND (0.40)	ND (0.018)	ND (0.019)
2-WS-SVO-15-44	82-085	21.9	18.9 (86.3)	6/18/84	ND	ND (0.40)	ND (0.018)	ND (0.021)

^aThe estimated limit of detection (LOD) for this compound is 0.40 µg/sample (2.5 x S/N). The estimated limit of quantitation (LQ) for this compound is 1.6 µg/sample (10 x S/N).

^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LQ.

Table 22. Data Report - Decachlorobiphenyl (CAS No. 2051-24-3) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (µg)	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (ng/g)
1-M0-SV0-0-14	82-036	9.0	5.6 (62.3)	4/19/84	ND	ND (1.0)	ND (0.11)	ND (0.18)
1-M0-SV0-15-44	82-037	18.3	13.6 (74.1)	4/19/84	ND	ND (1.0)	ND (0.055)	ND (0.074)
1-M0-SV0-45+	82-041	21.0	17.7 (84.3)	5/10/84	ND	ND (1.0)	ND (0.048)	ND (0.056)
1-NE-SV0-0-14	82-042	19.1	10.5 (55.1)	4/6/84	ND	ND (1.0)	ND (0.052)	ND (0.095)
1-NE-SV0-15-44	82-043	21.9	19.2 (87.6)	4/5/84	ND	ND (1.0)	ND (0.046)	ND (0.052)
1-NE-SV0-45+	82-044	26.7	21.1 (79.2)	4/15/84	ND	ND (1.0)	ND (0.037)	ND (0.047)
1-PA-SV0-0-14	82-046	19.7	12.4 (62.9)	4/19/84	ND	ND (1.0)	ND (0.050)	ND (0.081)
1-PA-SV0-45+	82-048	22.0	19.2 (87.1)	4/19/84	ND	ND (1.0)	ND (0.052)	ND (0.060)
1-MA-SV0-0-14	82-049	23.0	17.8 (77.5)	4/6/84	ND	ND (1.0)	ND (0.043)	ND (0.055)
1-MA-SV0-15-44	82-050	25.2	20.3 (80.7)	4/5/84	ND	ND (1.0)	ND (0.040)	ND (0.049)
1-MA-SV0-45+	82-051	16.2	13.4 (82.5)	6/1/84	ND	ND (1.0)	ND (0.062)	ND (0.075)
2-MA-SV0-0-14	82-052	20.2	17.1 (84.7)	6/13/84	ND	ND (1.0)	ND (0.050)	ND (0.058)
2-MA-SV0-15-44	82-053	26.1	20.4 (78.2)	6/12/84	ND	ND (1.0)	ND (0.038)	ND (0.049)
2-MA-SV0-45+	82-054	18.0	15.1 (83.9)	6/12/84	ND	ND (1.0)	ND (0.023)	ND (0.027)
1-EN-SV0-0-14	82-055	18.1	8.8 (48.6)	4/19/84	ND	ND (1.0)	ND (0.055)	ND (0.11)
1-EN-SV0-15-44	82-056	21.6	16.3 (75.5)	4/20/84	ND	ND (1.0)	ND (0.046)	ND (0.061)
1-EN-SV0-45+	82-057	19.8	16.0 (80.6)	4/20/84	ND	ND (1.0)	ND (0.051)	ND (0.063)
2-EN-SV0-0-14	82-058	21.2	14.7 (69.3)	6/5/84	ND	ND (1.0)	ND (0.047)	ND (0.068)
2-EN-SV0-15-44	82-059	21.4	17.8 (83.2)	6/4/84	ND	ND (1.0)	ND (0.047)	ND (0.056)
2-EN-SV0-45+	82-060	26.2	21.8 (83.2)	6/4/84	1	tr 1.4	tr 0.055	tr 0.066
3-EN-SV0-15-44	82-061	20.2	16.8 (83.2)	6/5/84	ND	ND (1.0)	ND (0.050)	ND (0.060)
3-EN-SV0-45+	82-062	23.2	19.8 (85.3)	6/6/84	ND	ND (1.0)	ND (0.043)	ND (0.051)
1-WN-SV0-0-14	82-063	23.4	14.8 (63.1)	5/7/84	ND	ND (1.0)	ND (0.043)	ND (0.068)
1-WN-SV0-15-44	82-064	20.6	15.7 (76.2)	5/4/84	ND	ND (1.0)	ND (0.049)	ND (0.064)
1-WN-SV0-45+	82-065	22.5	20.2 (89.8)	5/7/84	ND	ND (1.0)	ND (0.044)	ND (0.049)
2-WN-SV0-45+	82-066	21.4	17.2 (80.4)	6/5/84	ND	ND (1.0)	ND (0.047)	ND (0.058)

Table 22 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Analysis date	Number of peaks quantitated	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)
1-SA-SVO-0-14	82-067	20.7	16.8 (83.9)	5/11/84	ND	ND (1.0)	ND (0.048)	ND (0.060)
1-SA-SVO-15-44	82-068	26.4	22.8 (86.4)	4/20/84	ND	ND (1.0)	ND (0.038)	ND (0.044)
1-SA-SVO-45+	82-069	20.0	16.5 (82.5)	4/20/84	ND	ND (1.0)	ND (0.050)	ND (0.061)
2-SA-SVO-0-14	82-070	19.1	13.2 (69.1)	6/5/84	ND	ND (1.0)	ND (0.052)	ND (0.076)
2-SA-SVO-15-44	82-071	19.5	17.4 (89.3)	6/18/84	ND	ND (1.0)	ND (0.051)	ND (0.057)
2-SA-SVO-45+	82-072	26.1	21.9 (83.9)	6/4/84	1	tr 3.1	tr 0.12	tr 0.14
3-SA-SVO-15-44	82-073	17.9	12.6 (70.4)	6/5/84	ND	ND (1.0)	ND (0.056)	ND (0.079)
3-SA-SVO-45+	82-074	18.0	15.6 (86.7)	6/12/84	ND	ND (1.0)	ND (0.056)	ND (0.064)
4-SA-SVO-15-44	82-075	18.2	13.1 (72.0)	6/6/84	ND	ND (1.0)	ND (0.055)	ND (0.076)
4-SA-SVO-45+	82-076	17.6	12.4 (70.5)	6/12/84	1	tr 1.9	tr 0.11	tr 0.15
1-ES-SVO-0-14	82-077	28.1	21.7 (77.2)	6/1/84	ND	ND (1.0)	ND (0.036)	ND (0.046)
1-ES-SVO-15-44	82-078	19.9	16.6 (83.2)	5/10/84	ND	ND (1.0)	ND (0.020)	ND (0.024)
1-ES-SVO-45+	82-079	20.7	18.3 (88.4)	5/10/84	ND	ND (1.0)	ND (0.019)	ND (0.022)
2-ES-SVO-45+	82-081	21.1	16.5 (78.2)	6/6/84	ND	ND (1.0)	ND (0.047)	ND (0.060)
1-WS-SVO-0-14	82-082	11.1	7.5 (67.6)	5/8/84	ND	ND (1.0)	ND (0.090)	ND (0.13)
1-WS-SVO-15-44	82-083	22.7	19.7 (86.7)	5/4/84	ND	ND (1.0)	ND (0.044)	ND (0.051)
1-WS-SVO-45+	82-084	22.4	21.2 (94.6)	5/7/84	ND	ND (1.0)	ND (0.045)	ND (0.047)
2-WS-SVO-15-44	82-085	21.9	18.9 (86.3)	6/18/84	ND	ND (1.0)	ND (0.046)	ND (0.053)

^aThe estimated limit of detection (LOD) for this compound is 1.0 µg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LOQ) for this compound is 4.0 µg/sample ($10 \times S/N$).
^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

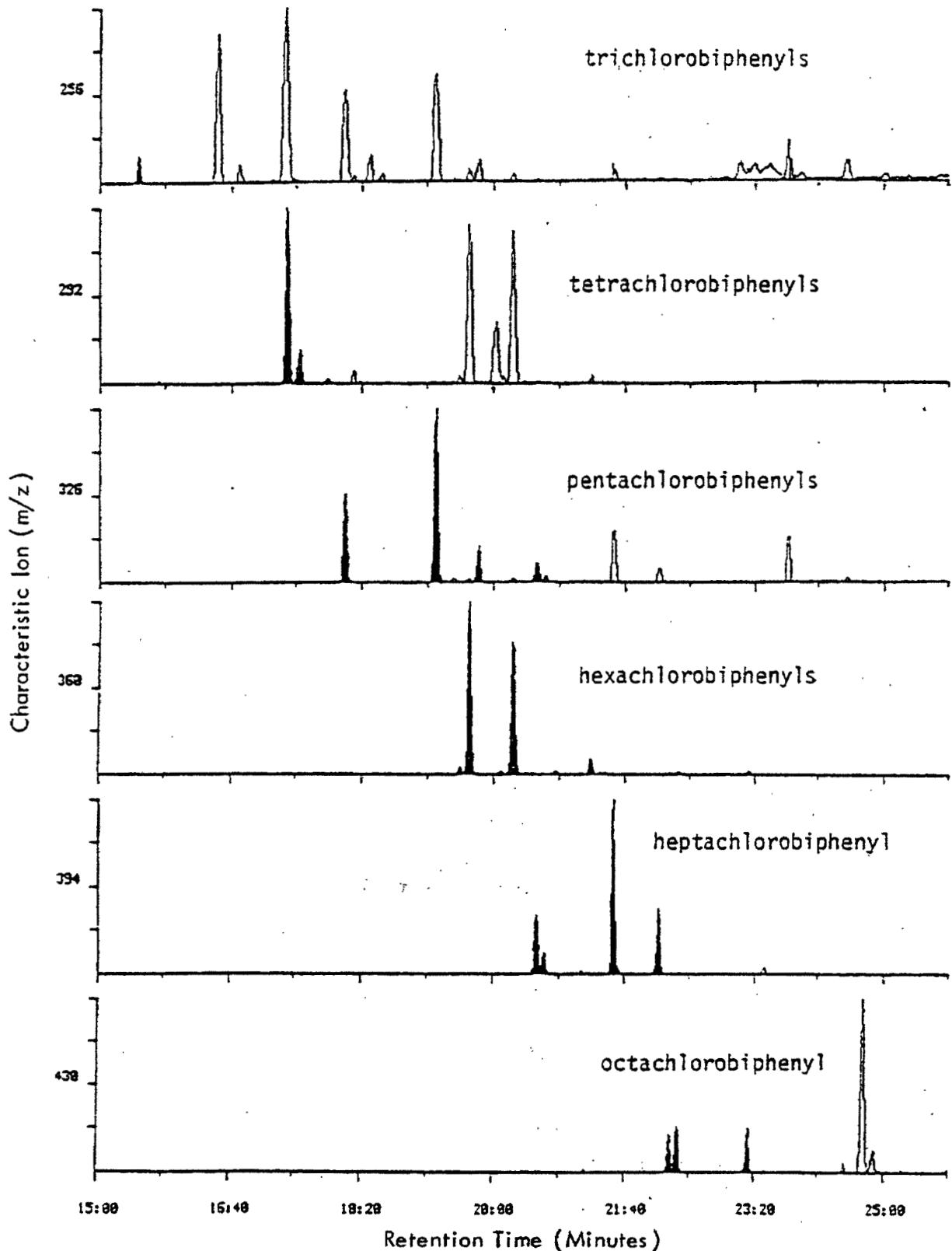


Figure 16. Selected ion plots for PCBs from HRGC/MS (scanning) analysis of human adipose tissue.

Table 23. Data Report - 1,2-Dichlorobenzene (CAS No. 95-50-1) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analysis date 6%
1-MO-SVO-0-14	82-036	9.0	5.6 (62.3)	ND (0.20)	ND (0.022)	ND (0.035)	4/19/84
1-MO-SVO-15-44	82-037	18.3	13.6 (74.1)	ND (0.20)	ND (0.011)	ND (0.015)	4/19/84
1-MO-SVO-45+	82-041	21.0	17.7 (84.3)	ND (0.20)	ND (0.010)	ND (0.011)	5/10/84
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	ND (0.20)	ND (0.010)	ND (0.019)	4/6/84
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	ND (0.20)	ND (0.009)	ND (0.010)	4/5/84
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	tr 0.77	tr 0.029	tr 0.036	4/6/84
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	ND (0.20)	ND (0.010)	ND (0.016)	4/19/84
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	ND (0.20)	ND (0.009)	ND (0.010)	4/19/84
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	ND (0.20)	ND (0.009)	ND (0.011)	4/6/84
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	ND (0.20)	ND (0.008)	ND (0.010)	4/5/84
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	ND (0.20)	ND (0.012)	ND (0.015)	6/1/84
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	ND (0.20)	ND (0.010)	ND (0.012)	6/12/84
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	ND (0.20)	ND (0.008)	ND (0.010)	6/12/84
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	tr 0.62	tr 0.034	tr 0.041	6/12/84
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	ND (0.20)	ND (0.011)	ND (0.023)	4/19/84
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	ND (0.20)	ND (0.009)	ND (0.012)	4/20/84
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	ND (0.20)	ND (0.010)	ND (0.013)	4/20/84
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	ND (0.20)	ND (0.009)	ND (0.014)	6/5/84
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	ND (0.20)	ND (0.009)	ND (0.011)	6/5/84
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	ND (0.20)	ND (0.008)	ND (0.010)	6/4/84
3-EN-SVO-0-14	82-061	20.2	16.8 (83.2)	tr 0.49	tr 0.024	tr 0.029	6/5/84
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	ND (0.20)	ND (0.009)	ND (0.010)	6/6/84
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	ND (0.20)	ND (0.009)	ND (0.004)	5/7/84
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	ND (0.20)	ND (0.010)	ND (0.013)	5/4/84
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	ND (0.20)	ND (0.009)	ND (0.010)	5/7/84
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	ND (0.20)	ND (0.009)	ND (0.012)	6/5/84

Table 23 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (μg)	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis date %
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	ND (0.20)	ND (0.010)	ND (0.012)	5/11/84
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	ND (0.20)	ND (0.008)	ND (0.009)	4/20/84
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	ND (0.20)	ND (0.010)	ND (0.012)	4/20/84
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	tr 0.22	tr 0.012	tr 0.017	6/5/84
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	ND (0.20)	ND (0.010)	ND (0.011)	6/18/84
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	ND (0.20)	ND (0.011)	ND (0.016)	6/5/84
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	ND (0.20)	ND (0.011)	ND (0.013)	6/12
4-SA-SV0-15-44	82-075	18.2	13.1 (72.0)	ND (0.20)	ND (0.011)	ND (0.015)	6/6/84
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	ND (0.20)	ND (0.011)	ND (0.016)	6/12/84
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	ND (0.20)	ND (0.007)	ND (0.009)	6/1/84
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	ND (0.20)	ND (0.010)	ND (0.012)	5/10/84
1-ES-SV0-45+	82-079	20.7	18.3 (88.4)	ND (0.20)	ND (0.010)	ND (0.011)	5/10/84
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	ND (0.20)	ND (0.009)	ND (0.012)	6/6/84
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	ND (0.20)	ND (0.018)	ND (0.027)	5/8/84
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	ND (0.20)	ND (0.009)	ND (0.010)	5/4/84
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	1.2	0.054	0.057	5/7/84
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	ND (0.20)	ND (0.009)	ND (0.010)	6/18/84

a The estimated limit of detection (LOD) for this compound is 0.20 μg/sample (2.5 × S/N). The estimated limit of quantitation (LOQ) for this compound is 0.80 μg/sample (10 × S/N).

b ND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

Table 24. Data Report - 1,2,4-Trichlorobenzene (CAS No. 120-82-1) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg)	b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analysis date 6%
1-MO-SVO-0-14	82-036	9.0	5.6 (62.3)	ND (0.20)	ND (0.022)	ND (0.035)	4/19/84	4/19/84
1-MO-SVO-15-44	82-037	18.3	13.6 (74.1)	ND (0.20)	ND (0.011)	ND (0.015)	4/19/84	4/19/84
1-MO-SVO-45+	82-041	21.0	17.7 (84.3)	ND (0.20)	ND (0.010)	ND (0.011)	5/10/84	5/10/84
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	ND (0.20)	ND (0.010)	ND (0.019)	4/6/84	4/6/84
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	ND (0.20)	ND (0.009)	ND (0.010)	4/5/84	4/5/84
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	ND (0.20)	ND (0.007)	ND (0.009)	4/6/84	4/6/84
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	ND (0.20)	ND (0.010)	ND (0.016)	4/19/84	4/19/84
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	ND (0.20)	ND (0.009)	ND (0.010)	4/19/84	4/19/84
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	ND (0.20)	ND (0.009)	ND (0.011)	4/6/84	4/6/84
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	ND (0.20)	ND (0.008)	ND (0.010)	4/5/84	4/5/84
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	ND (0.20)	ND (0.012)	ND (0.015)	6/1/84	6/1/84
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	ND (0.20)	ND (0.010)	ND (0.012)	6/12/84	6/12/84
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	ND (0.20)	ND (0.008)	ND (0.010)	6/12/84	6/12/84
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	ND (0.20)	ND (0.011)	ND (0.013)	6/12/84	6/12/84
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	ND (0.20)	ND (0.011)	ND (0.023)	4/19/84	4/19/84
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	ND (0.20)	ND (0.009)	ND (0.012)	4/20/84	4/20/84
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	ND (0.20)	ND (0.010)	ND (0.013)	4/20/84	4/20/84
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	ND (0.20)	ND (0.009)	ND (0.014)	6/5/84	6/5/84
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	ND (0.20)	ND (0.009)	ND (0.011)	6/5/84	6/5/84
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	ND (0.20)	ND (0.008)	ND (0.009)	6/4/84	6/4/84
3-EN-SVO-15-44	82-061	20.2	16.8 (83.2)	ND (0.20)	ND (0.010)	ND (0.012)	6/5/84	6/5/84
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	tr 0.34	tr 0.15	tr 0.017	6/6/84	6/6/84
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	ND (0.20)	ND (0.009)	ND (0.014)	5/7/84	5/7/84
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	ND (0.20)	ND (0.010)	ND (0.012)	5/4/84	5/4/84
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	ND (0.20)	ND (0.009)	ND (0.010)	5/7/84	5/7/84
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	ND (0.20)	ND (0.009)	ND (0.012)	6/5/84	6/5/84

Table 24 (continued)

Sample composite number	NRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis date %
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	ND (0.20)	ND (0.010)	ND (0.012)	5/11/84
1-SA-SV0-15-44	82-068	62.4	22.8 (86.4)	ND (0.20)	ND (0.008)	ND (0.009)	4/20/84
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	ND (0.20)	ND (0.010)	ND (0.012)	4/20/84
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	ND (0.20)	ND (0.010)	ND (0.015)	6/5/84
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	ND (0.20)	ND (0.010)	ND (0.011)	6/18/84
2-SA-SV0-45+	82-072	26.1	21.9 (83.9)	ND (0.20)	ND (0.008)	ND (0.009)	6/4/84
3-SA-SV0-0-14	82-073	17.9	12.6 (70.4)	ND (0.20)	ND (0.011)	ND (0.016)	6/5/84
3-SA-SV0-15-44	82-074	18.0	15.6 (86.7)	ND (0.20)	ND (0.011)	ND (0.013)	6/12/84
4-SA-SV0-15-44	82-075	18.2	13.1 (72.0)	tr 0.26	tr 0.015	tr 0.021	6/6/84
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	ND (0.20)	ND (0.011)	ND (0.016)	6/12/84
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	ND (0.20)	ND (0.007)	ND (0.009)	6/1/84
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	ND (0.20)	ND (0.010)	ND (0.012)	5/10/84
1-ES-SV0-45+	82-079	20.7	18.3 (88.4)	ND (0.20)	ND (0.010)	ND (0.011)	5/10/84
2-ES-SV0-0-14	82-080	25.7	22.5 (87.5)	ND (0.20)	ND (0.008)	ND (0.009)	6/6/84
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	ND (0.20)	ND (0.009)	ND (0.012)	6/6/84
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	ND (0.20)	ND (0.018)	ND (0.027)	5/8/84
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	ND (0.20)	ND (0.009)	ND (0.010)	5/4/84
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	ND (0.20)	ND (0.009)	ND (0.009)	5/7/84
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	ND (0.20)	ND (0.009)	ND (0.011)	6/18/84

^aThe estimated limit of detection (LOD) is 0.20 μg/sample (2.5 x S/N). The estimated limit of quantitation (LQ) is 0.80 μg/sample (10 x S/N).

^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LQ.

Table 25. Data Report - Hexachlorobenzene (CAS No. 118-74-1) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	NRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis date
1-MO-SV0-0-14	82-036	9.0	5.6 (62.3)	ND (0.20)	ND (0.022)	ND (0.036)	4/19/84
1-MO-SV0-15-44	82-037	18.3	13.6 (74.1)	tr 0.31	tr 0.017	tr 0.023	4/19/84
1-MO-SV0-45+	82-041	21.0	17.7 (84.3)	tr 0.59	tr 0.028	tr 0.033	5/10/84
1-NE-SV0-0-14	82-042	19.1	10.5 (55.1)	ND (0.20)	ND (0.010)	ND (0.019)	4/6/84
1-NE-SV0-15-44	82-043	21.9	19.2 (87.6)	tr 24	tr 1.1	tr 1.3	4/5/84
1-NE-SV0-45+	82-044	26.7	21.1 (79.2)	tr 0.31	tr 0.012	tr 0.015	4/6/84
1-PA-SV0-0-14	82-045	19.7	12.4 (62.9)	tr 0.37	tr 0.019	tr 0.030	4/19/84
1-PA-SV0-45+	82-048	22.0	19.2 (87.1)	tr 1.7	tr 0.079	tr 0.091	4/19/84
1-MA-SV0-0-14	82-049	23.0	17.8 (77.5)	tr 0.44	tr 0.019	tr 0.025	4/6/84
1-MA-SV0-15-44	82-050	25.2	20.3 (80.7)	tr 11	tr 0.44	tr 0.54	4/5/84
1-MA-SV0-45+	82-051	16.2	13.4 (82.5)	tr 0.40	tr 0.025	tr 0.030	6/1/84
2-MA-SV0-0-14	82-052	20.2	17.1 (84.7)	tr 0.25	tr 0.013	tr 0.015	6/12/84
2-MA-SV0-15-44	82-053	26.1	20.4 (78.2)	tr 0.39	tr 0.015	tr 0.019	6/12/84
2-MA-SV0-45+	82-054	18.0	15.1 (83.9)	ND (0.20)	ND (0.011)	ND (0.013)	6/12/84
1-EN-SV0-0-14	82-055	18.1	8.8 (48.6)	ND (0.20)	ND (0.011)	ND (0.023)	4/19/84
1-EN-SV0-15-44	82-056	21.6	16.3 (75.5)	tr 0.51	tr 0.024	tr 0.032	4/20/84
1-EN-SV0-45+	82-057	19.8	16.0 (80.6)	tr 0.59	tr 0.035	tr 0.043	4/20/84
2-EN-SV0-0-14	82-058	21.2	14.7 (69.3)	ND (0.20)	ND (0.009)	ND (0.014)	6/5/84
2-EN-SV0-15-44	82-059	21.4	17.8 (83.2)	tr 0.51	tr 0.024	tr 0.029	6/5/84
2-EN-SV0-45+	82-060	26.2	21.8 (83.2)	tr 0.46	tr 0.018	tr 0.022	6/4/84
3-EN-SV0-0-14	82-061	20.2	16.8 (83.2)	ND (0.20)	ND (0.010)	ND (0.012)	6/5/84
3-EN-SV0-15-44	82-062	23.2	19.8 (85.3)	tr 0.47	tr 0.020	tr 0.024	6/6/84
1-WN-SV0-0-14	82-063	23.4	14.8 (63.1)	tr 0.59	tr 0.025	tr 0.040	5/7/84
1-WN-SV0-15-44	82-064	20.6	15.7 (76.2)	tr 0.52	tr 0.025	tr 0.034	5/4/84
1-WN-SV0-45+	82-065	22.5	20.2 (89.8)	tr 1.00	tr 0.044	tr 0.055	5/7/84
2-WN-SV0-45+	82-066	21.4	17.2 (80.4)	ND (0.20)	ND (0.009)	ND (0.012)	6/5/84

Table 25 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (ug) ^b	Concentration - wet tissue (ug/g)	Concentration - extractable lipid (ug/g)	Analysis date
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	tr 0.66	tr 0.032	tr 0.038	5/11/84
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	tr 0.73	tr 0.028	tr 0.032	4/20/84
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	tr 1.2	tr 0.059	tr 0.072	4/20/84
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	ND (0.20)	ND (0.010)	ND (0.015)	6/5/84
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	tr 0.20	tr 0.010	tr 0.012	6/18/84
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	tr 0.24	tr 0.013	tr 0.019	6/5/84
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	tr 0.27	tr 0.015	tr 0.017	6/12/84
4-SA-SV0-15-44	82-075	18.2	13.1 (72.0)	tr 0.23	tr 0.012	tr 0.017	6/6/84
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	tr 0.46	tr 0.026	tr 0.037	6/12/84
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	tr 0.59	tr 0.021	tr 0.027	6/1/84
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	tr 0.42	tr 0.021	tr 0.025	5/10/84
1-ES-SV0-45+	82-079	20.7	18.3 (88.4)	tr 0.47	tr 0.023	tr 0.026	5/10/84
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	tr 0.42	tr 0.020	tr 0.026	6/6/84
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	ND (0.20)	ND (0.018)	ND (0.027)	5/8/84
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	tr 0.69	tr 0.030	tr 0.035	5/4/84
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	2.3	0.10	0.11	5/7/84
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	tr 0.43	tr 0.020	tr 0.023	6/18/84

^aThe estimated limit of detection (LOD) for this compound is 0.20 µg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LOQ) for this compound is 0.80 µg/sample ($10 \times S/N$).

^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

d. Phosphate Triesters

Tables 26 to 28 summarize data for triphenyl-, tributyl- and tris(2-chloroethyl)phosphate. Triphenylphosphate was detected in the associated method blanks as well as in the samples. The data in Table 26 were corrected for this background contribution. The data for tributyl- and tris(2-chloroethyl)phosphate indicate that these compounds were detected at trace levels in only one sample each. Prior to this study, the only information on the presence of phosphate triesters in human adipose tissues was reported by Health and Welfare Canada (LeBel, Williams 1983). In that study, 16 adipose tissue samples were analyzed as part of a method development program. The sample analysis was based on GPC separation of the lipid, fractionation of the extract on a microflorisil column and analysis by either HRGC/MS or HRGC/SIM. The data from the 16 samples indicated the presence of n-butyl, butoxyethyl, and 1,3-dichloropropyl phosphate triesters.

e. Phthalate Esters

Four phthalate esters were determined in the composited FY82 NHATS specimens, including the diethyl, di-n-butyl-, di-n-octyl-, and the butyl-benzyl analogs. It should be noted that these phthalate esters were also detected in method blanks prepared and analyzed with the composite samples. All phthalate data reported in Tables 29 to 32 were corrected for a specific blank taken through the Florisil column with a designated set of samples. Blank values ranged from 0.079 to 1.5 µg for diethyl phthalate, 1.2 to 12 µg for di-n-butyl phthalate, and 2.9 to 20 µg for di-n-octyl phthalate. Blank values for butylbenzyl phthalate ranged from not detected at 0.20 µg to 0.78 µg.

Dimethyl phthalate was also included in the analytical standard and automated search and quantitation routines. This phthalate ester was not detected in any of the samples.

f. Polynuclear Aromatic hydrocarbons (PAH)

The method evaluation studies indicated that PAH compounds are recovered in both the 6% and 15/50% diethyl ether in hexane Florisil fraction via the HRGC/MS analysis procedure. Tables 33 and 34 summarize the data for naphthalene and phenanthrene that were included in the automated HRGC/MS quantitation routine for the composite sample extracts. Naphthalene and phenanthrene were determined at trace levels in a few of the sample extracts.

g. Additional Compounds

In addition to the data reported in Tables 7 to 34, the HRGC/MS data were also searched for additional compound classes including PBBs, PCDEs, PCTs, and chlorophenol. Table 35 includes compounds or compound classes that were included in the method evaluation studies and spiked QC samples but were not detected in the composite specimens. Estimated detection limits for these analytes are provided based on the observed instrumental sensitivity from the calibration standards. It should be noted that the estimated detection limits for the compound classes such as the chlorobenzenes, chlorophenols, PCBs, PBBs, PCTs, etc., represent the method sensitivity for a single isomer rather than the entire homolog.

Table 26. Data Report - Triphenyl Phosphate (CAS No. 115-86-6) - FY 82 Composite Adipose Tissue Samples

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g	Total mass detected (µg)	Concentration - wet tissue (µg/g)	Concentration - wet tissue (µg/g)	Concentratable lipid extractable lipid (µg/g)	Analysis date
1-MO-SVO-15-44	82-037	18.3	13.6 (74.1)	tr 0.89	tr 0.074	tr 0.10	4/24/84	
1-MO-SVO-45+	82-041	21.0	17.7 (84.3)	9.6	0.46	0.54	5/14/84	
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	ND (0.40)	ND (0.021)	ND (0.038)	4/23/84	
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	ND (0.40)	ND (0.018)	ND (0.021)	4/10/84	
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	ND (0.40)	ND (0.015)	ND (0.019)	4/23/84	
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	ND (0.40)	ND (0.020)	ND (0.032)	4/24/84	
1-PA-SVO-15-44	82-047	21.6	14.7 (68.0)	ND (0.40)	ND (0.019)	ND (0.027)	4/27/84	
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	ND (0.40)	ND (0.018)	ND (0.021)	4/25/84	
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	ND (0.40)	ND (0.017)	ND (0.022)	4/23/84	
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	ND (0.40)	ND (0.016)	ND (0.020)	4/12/84	
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	ND (0.40)	ND (0.025)	ND (0.030)	4/24/84	
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	3.8	0.19	0.22	6/13/84	
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	8.7	0.33	0.42	6/13/84	
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	1.9	0.11	0.13	6/13/84	
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	ND (0.40)	ND (0.022)	ND (0.045)	4/25/84	
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	ND (0.40)	ND (0.019)	ND (0.025)	4/26/84	
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	ND (0.40)	ND (0.020)	ND (0.025)	4/26/84	
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	1,070	50	73	6/14/84	
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	9.0	0.42	0.51	6/14/84	
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	tr 0.99	tr 0.038	tr 0.045	6/14/84	
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	ND (0.40)	ND (0.017)	ND (0.020)	6/16/84	
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	ND (0.75) ^c	ND (0.032)	ND (0.051)	5/10/84	
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	ND (0.96) ^c	ND (0.047)	ND (0.061)	5/11/84	
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	ND (4.3)	ND (0.19)	ND (0.21)	5/10/84	
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	3.8	0.18	0.22	6/15/84	

Table 26 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (μg)	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis date
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	ND (0.40)	ND (0.019)	ND (0.023)	4/26/84
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	ND (0.40)	ND (0.015)	ND (0.018)	4/24/84
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	ND (0.40)	ND (0.020)	ND (0.024)	4/24/84
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	tr 1.2	tr 0.062	tr 0.090	6/15/84
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)		0.084	0.094	6/14/84
2-SA-SV0-45+	82-072	26.1	21.9 (83.9)		1.6	0.061	6/13/84
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	ND (0.40)	ND (0.022)	ND (0.022)	6/16/84
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	ND (0.40)	ND (0.022)	ND (0.026)	6/16/84
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	ND (0.40)	ND (0.023)	ND (0.032)	6/18/84
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	2.7	0.096	0.124	5/14/84
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	3.3	0.16	0.20	5/14/84
2-ES-SV0-15-44	82-080	25.7	22.5 (87.5)	ND (0.40)	ND (0.016)	ND (0.018)	6/15/84
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	ND (0.40)	ND (0.019)	ND (0.024)	6/16/84
1-W5-SV0-0-14	82-082	11.1	7.5 (67.6)	ND (4.4)	ND (0.40)	ND (0.59)	5/14/84
1-W5-SV0-15-44	82-083	22.7	19.7 (86.7)	ND (1.9)	ND (0.084)	ND (0.097)	5/9/84
1-W5-SV0-45+	82-084	22.4	21.2 (94.6)	18	0.80	0.85	5/10/84
2-W5-SV0-15-44	82-085	21.9	18.9 (86.3)	tr 1.5	tr 0.068	tr 0.079	6/15/84

^aThe estimated limit of detection (LOD) is 0.40 μg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LOQ) is 1.6 μg/sample ($10 \times S/N$).

^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

^cThe concentration of the analyte in the sample was less than the observed concentration in the respective method blank. The value reported as the detection limit corresponds to the blank value.

Table 27. Data Report - Tributyl Phosphate (CAS No. 126-73-8) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	NRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg)	Concentration - wet tissue (µg/g) ^b	Concentration - extractable lipid (µg/g)	Analysis date
1-MO-SVO-15-44	82-037	18.3	13.6 (74.1)	ND (1.0)	ND (0.055)	ND (0.074)	4/24/84
1-MO-SVO-45+	82-041	21.0	17.7 (84.3)	ND (1.0)	ND (0.048)	ND (0.056)	5/14/84
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	ND (1.0)	ND (0.052)	ND (0.095)	4/23/84
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	ND (1.0)	ND (0.045)	ND (0.052)	4/10/84
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	ND (1.0)	ND (0.037)	ND (0.047)	4/23/84
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	ND (1.0)	ND (0.051)	ND (0.081)	4/24/84
1-PA-SVO-15-44	82-047	21.6	14.7 (68.0)	ND (1.0)	ND (0.046)	ND (0.068)	4/27/84
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	ND (1.0)	ND (0.045)	ND (0.052)	4/25/84
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	ND (1.0)	ND (0.043)	ND (0.056)	4/23/84
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	ND (1.0)	ND (0.040)	ND (0.049)	4/12/84
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	ND (1.0)	ND (0.062)	ND (0.075)	4/24/84
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	ND (1.0)	ND (0.050)	ND (0.058)	6/13/84
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	ND (1.0)	ND (0.038)	ND (0.049)	6/13/84
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	ND (1.0)	ND (0.055)	ND (0.066)	6/13/84
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	ND (1.0)	ND (0.055)	ND (0.11)	4/25/84
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	ND (1.0)	ND (0.046)	ND (0.061)	4/26/84
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	ND (1.0)	ND (0.051)	ND (0.063)	4/26/84
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	tr 1.8	tr 0.086	tr 0.12	6/14/84
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	ND (1.0)	ND (0.047)	ND (0.056)	6/14/84
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	ND (1.0)	ND (0.038)	ND (0.046)	6/14/84
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	ND (1.0)	ND (0.043)	ND (0.046)	6/16/84
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	ND (1.0)	ND (0.043)	ND (0.068)	5/10/84
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	ND (1.0)	ND (0.049)	ND (0.064)	5/11/84
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	ND (1.0)	ND (0.044)	ND (0.049)	5/10/84
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	ND (1.0)	ND (0.047)	ND (0.058)	6/15/84

Table 27 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis date
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	ND (1.0)	ND (0.048)	ND (0.058)	4/26/84
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	ND (1.0)	ND (0.038)	ND (0.044)	4/24/84
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	ND (1.0)	ND (0.050)	ND (0.061)	4/24/84
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	ND (1.0)	ND (0.052)	ND (0.076)	6/15/84
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	ND (1.0)	ND (0.051)	ND (0.057)	6/14/84
2-SA-SV0-45+	82-072	26.1	21.9 (83.9)	ND (1.0)	ND (0.038)	ND (0.046)	6/13/84
3-SA-SV0-0-15-44	82-073	17.9	12.6 (70.4)	ND (1.0)	ND (0.056)	ND (0.079)	6/16/84
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	ND (1.0)	ND (0.056)	ND (0.064)	6/16/84
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	ND (1.0)	ND (0.057)	ND (0.081)	6/18/84
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	ND (1.0)	ND (0.036)	ND (0.046)	5/14/84
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	ND (1.0)	ND (0.050)	ND (0.060)	5/14/84
1-ES-SV0-45+	82-079	20.7	18.3 (88.4)	ND (1.0)	ND (0.048)	ND (0.055)	5/14/84
2-ES-SV0-0-15-44	82-080	25.7	22.5 (87.5)	ND (1.0)	ND (0.039)	ND (0.044)	6/15/84
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	ND (1.0)	ND (0.047)	ND (0.061)	6/16/84
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	ND (1.0)	ND (0.090)	ND (0.13)	5/14/84
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	ND (1.0)	ND (0.044)	ND (0.051)	5/9/84
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	ND (1.0)	ND (0.045)	ND (0.047)	5/10/84
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	ND (1.0)	ND (0.046)	ND (0.053)	6/15/84

^aThe estimated limit of detection (LOD) is 1.0 μg/sample (2.5 x S/N). The estimated limit of quantitation (LOQ) is 1.6 μg/sample (10 x S/N).

ND = not detected.
LOD and LOQ.

Table 28. Data Report - tris(2-Chloroethyl) Phosphate (CAS No. 115-96-8) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - wet extractable lipid (µg/g)	Analysis date
1-MO-SVO-0-14	82-036	9.0	5.6 (62.3)	ND (0.80)	ND (0.090)	ND (0.15)	4/24/84
1-MO-SVO-15-44	82-037	18.3	13.6 (74.1)	ND (0.80)	ND (0.044)	ND (0.060)	4/24/84
1-MO-SVO-45+	82-041	21.0	17.7 (84.3)	ND (0.80)	ND (0.039)	ND (0.046)	5/14/84
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	ND (0.80)	ND (0.042)	ND (0.077)	4/23/84
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	ND (0.80)	ND (0.037)	ND (0.042)	4/10/84
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	ND (0.80)	ND (0.030)	ND (0.038)	4/23/84
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	ND (0.80)	ND (0.041)	ND (0.065)	4/24/84
1-PA-SVO-15-44	82-047	21.6	14.7 (68.0)	ND (0.80)	ND (0.038)	ND (0.055)	2/27/84
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	ND (0.80)	ND (0.037)	ND (0.042)	4/25/84
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	ND (0.80)	ND (0.035)	ND (0.046)	4/23/84
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	ND (0.80)	ND (0.032)	ND (0.040)	4/12/84
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	ND (0.80)	ND (0.049)	ND (0.060)	4/24/84
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	ND (0.80)	ND (0.040)	ND (0.047)	6/13/84
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	ND (0.80)	ND (0.031)	ND (0.040)	6/13/84
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	ND (0.80)	ND (0.045)	ND (0.054)	6/13/84
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	ND (0.80)	ND (0.045)	ND (0.092)	4/25/84
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	ND (0.80)	ND (0.038)	ND (0.050)	4/26/84
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	ND (0.80)	ND (0.041)	ND (0.051)	4/26/84
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	ND (0.80)	ND (0.038)	ND (0.055)	6/14/84
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	ND (0.80)	ND (0.038)	ND (0.046)	6/14/84
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	ND (0.80)	ND (0.031)	ND (0.037)	6/14/84
3-EN-SVO-0-14	82-061	20.2	16.8 (83.2)	ND (0.80)	ND (0.040)	ND (0.048)	6/18/84
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	ND (0.80)	ND (0.035)	ND (0.041)	6/16/84
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	ND (0.80)	ND (0.035)	ND (0.055)	5/10/84
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	ND (0.80)	ND (0.039)	ND (0.052)	5/11/84
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	ND (0.80)	ND (0.036)	ND (0.040)	5/10/84
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	ND (0.80)	ND (0.038)	ND (0.047)	6/15/84

Table 28 (continued)

Sample composite	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%) ^b	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analysis date
1-SA-SVO-0-14	82-067	20.7	16.8 (83.9)	ND (0.80)	ND (0.039)	ND (0.048)	4/26/84
1-SA-SVO-15-44	82-068	26.4	22.8 (86.4)	ND (0.80)	ND (0.030)	ND (0.035)	4/24/84
1-SA-SVO-45+	82-069	20.0	16.5 (82.5)	ND (0.80)	ND (0.041)	ND (0.049)	4/24/84
2-SA-SVO-0-14	82-070	19.1	13.2 (69.1)	ND (0.80)	ND (0.042)	ND (0.061)	6/15/84
2-SA-SVO-15-44	82-071	19.5	17.4 (89.3)	ND (0.80)	ND (0.042)	ND (0.046)	6/14/84
2-SA-SVO-45+	82-072	26.1	21.9 (83.9)	ND (0.80)	ND (0.031)	ND (0.037)	6/13/84
3-SA-SVO-15-44	82-073	17.9	12.6 (70.4)	ND (0.80)	ND (0.045)	ND (0.064)	6/16/84
3-SA-SVO-45+	82-074	18.0	15.6 (86.7)	ND (0.80)	ND (0.045)	ND (0.052)	6/16/84
4-SA-SVO-15-44	82-075	18.2	13.1 (72.0)	ND (0.80)	ND (0.045)	ND (0.052)	6/18/84
4-SA-SVO-45+	82-076	17.6	12.4 (70.5)	ND (0.80)	ND (0.049)	ND (0.062)	6/18/84
ND (0.065)	ND (0.046)	ND (0.065)	ND (0.065)	ND (0.065)	ND (0.065)	ND (0.065)	6/18/84
1-ES-SVO-0-14	82-077	28.1	21.7 (77.2)	ND (0.80)	ND (0.029)	ND (0.037)	5/14/84
1-ES-SVO-15-44	82-078	19.9	16.6 (83.2)	ND (0.80)	ND (0.041)	ND (0.049)	5/14/84
1-ES-SVO-45+	82-079	20.7	18.3 (88.4)	ND (0.80)	ND (0.039)	ND (0.044)	5/14/84
2-ES-SVO-15-44	82-080	25.7	22.5 (87.5)	ND (0.80)	ND (0.031)	ND (0.036)	6/15/84
2-ES-SVO-45+	82-081	21.1	16.5 (78.2)	ND (0.80)	ND (0.047)	ND (0.049)	6/16/84
1-WS-SVO-0-14	82-082	11.1	7.5 (67.6)	tr 1.6	tr 0.14	tr 0.21	5/14/84
1-WS-SVO-15-44	82-083	22.7	19.7 (86.7)	ND (0.80)	ND (0.036)	ND (0.041)	5/9/84
1-WS-SVO-45+	82-084	22.4	21.2 (94.6)	ND (0.80)	ND (0.036)	ND (0.038)	5/10/84
2-WS-SVO-15-44	82-085	21.9	18.9 (86.3)	ND (0.80)	ND (0.037)	ND (0.043)	6/15/84

a. The estimated limit of detection (LOD) for this compound is 0.80 µg/sample (2.5 x S/N). The estimated limit of quantitation (LQ) for this compound is 3.2 µg/sample (10 x S/N).

b. ND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LQ.

Table 29. Data Report - Diethyl Phthalate (CAS No. 84-66-2) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g	% detected	Total mass detected (µg)	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analysis Date
1-MD-SVO-15-44	82-037	18.3	13.6 (74.1)	ND (0.50) ^c	ND (0.027)	ND (0.037)	4/24/84	
1-MD-SVO-45+	82-041	21.0	17.7 (84.3)	0.87	0.042	0.049	5/14/84	
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	tr 0.34	tr 0.018	tr 0.032	4/23/84	
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	tr 0.32	tr 0.015	tr 0.017	4/10/84	
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	tr 0.38	tr 0.014	tr 0.018	4/23/84	
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	ND (0.45) ^c	ND (0.023)	ND (0.036)	4/24/84	
1-PA-SVO-15-44	82-047	21.6	14.7 (68.0)	ND (0.50) ^c	ND (0.023)	ND (0.034)	4/27/84	
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	ND (0.49) ^c	ND (0.022)	ND (0.026)	4/25/84	
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	ND (0.20)	ND (0.009)	ND (0.011)	4/23/84	
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	tr 0.41	tr 0.016	tr 0.020	4/12/84	
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	ND (0.20)	ND (0.012)	ND (0.015)	4/24/84	
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	1.7	0.085	0.10	6/13/84	
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	ND (0.20)	ND (0.008)	ND (0.010)	6/13/84	
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	ND (0.20)	ND (0.011)	ND (0.013)	6/13/84	
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	ND (0.43) ^c	ND (0.024)	ND (0.049)	4/25/84	
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	ND (0.33) ^c	ND (0.015)	ND (0.020)	4/26/84	
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	ND (0.60) ^c	ND (0.030)	ND (0.037)	4/26/84	
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	8.6	0.41	0.59	6/14/84	
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	1.2	0.054	0.065	6/14/84	
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	tr 0.46	tr 0.017	tr 0.021	6/14/84	
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	ND (0.20)	ND (0.009)	ND (0.010)	6/16/84	
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	ND (0.20)	ND (0.009)	ND (0.014)	5/10/84	
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	1.2	0.058	0.076	5/11/84	
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	tr 0.64	tr 0.029	tr 0.032	5/10/84	
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	3.3	0.15	0.19	6/15/84	

Table 29 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis Date
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	ND (1.3) ^c	ND (0.061)	ND (0.076)	4/26/84
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	ND (0.90) ^c	ND (0.034)	ND (0.039)	4/24/84
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	ND (0.20)	ND (0.010)	ND (0.012)	4/24/84
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	ND (0.20)	ND (0.010)	ND (0.010)	4/24/84
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	tr 0.47	tr 0.024	tr 0.027	6/15/84
2-SA-SV0-45+	82-072	26.1	21.9 (83.9)	tr 1.0	0.038	0.046	6/14/84
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	tr 0.49	tr 0.027	tr 0.039	6/13/84
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	ND (0.20)	ND (0.011)	ND (0.013)	6/16/84
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	ND (0.20)	ND (0.011)	ND (0.016)	6/16/84
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	1.8	0.062	0.081	5/14/84
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	2.1	0.10	0.12	5/14/84
2-ES-SV0-15-44	82-080	25.7	22.5 (87.5)	tr 0.57	tr 0.022	tr 0.025	6/15/84
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	ND (0.20)	ND (0.009)	ND (0.012)	6/16/84
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	7.2	0.65	0.97	5/14/84
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	8.5	0.37	0.43	5/9/84
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	ND (0.20)	ND (0.009)	ND (0.009)	5/10/84
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	ND (0.20)	ND (0.009)	ND (0.011)	6/15/84

^aThe estimated limit of detection (LOD) for this compound is 0.20 μg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LOQ) for this compound is 0.80 μg/sample ($10 \times S/N$). Value in parentheses is the estimated limit of detection (LOD). tr = trace.

^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.
^cThe concentration of the analyte in the sample was less than the observed concentration in the respective method blank. The value reported as the detection limit corresponds to the blank value.

Table 30. Data Report - Di-n-butyl Phthalate (CAS No. 84-74-2) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MR sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg)	Concentration - wet tissue (µg/g) ^b	Concentration - wet extractable lipid (µg/g)	Analysis Date
1-MO-SV0-15-44	82-037	18.3	13.6 (74.1)	ND (2.4) ^c	ND (0.13)	ND (0.18)	4/24/84
1-MO-SV0-45+	82-041	21.0	17.7 (84.3)	ND (0.20)	ND (0.010)	ND (0.011)	5/14/84
1-NE-SV0-0-14	82-042	19.1	10.5 (55.1)	ND (0.20)	ND (0.010)	ND (0.019)	4/23/84
1-NE-SV0-15-44	82-043	21.9	19.2 (87.6)	ND (0.20)	ND (0.009)	ND (0.010)	4/10/84
1-NE-SV0-45+	82-044	26.7	21.1 (79.2)	tr 0.28	tr 0.011	tr 0.013	4/23/84
1-PA-SV0-0-14	82-046	19.7	12.4 (62.9)	ND (0.76) ^c	ND (0.039)	ND (0.061)	4/24/84
1-PA-SV0-15-44	82-047	21.6	14.7 (68.0)	ND (1.8) ^c	ND (0.082)	ND (0.12)	4/27/84
1-PA-SV0-45+	82-048	22.0	19.2 (87.1)	ND (2.6) ^c	ND (0.12)	ND (0.14)	4/25/84
1-MA-SV0-0-14	82-049	23.0	17.8 (77.5)	tr 0.21	tr 0.009	tr 0.012	4/23/84
1-MA-SV0-15-44	82-050	25.2	20.3 (80.7)	tr 0.72	tr 0.028	tr 0.035	4/12/84
1-MA-SV0-45+	82-051	16.2	13.4 (82.5)	tr 0.26	tr 0.016	tr 0.019	4/24/84
2-MA-SV0-0-14	82-052	20.2	17.1 (84.7)	ND (0.20)	ND (0.010)	ND (0.012)	6/13/84
2-MA-SV0-15-44	82-053	26.1	20.4 (78.2)	66	2.5	3.2	6/13/84
2-MA-SV0-45+	82-054	18.0	15.1 (83.9)	4.8	0.27	0.32	6/13/84
1-EN-SV0-0-14	82-055	18.1	8.8 (48.6)	ND (1.3)	ND (0.072)	ND (0.077)	4/25/84
1-EN-SV0-15-44	82-056	21.6	16.3 (75.5)	ND (1.2)	ND (0.053)	ND (0.071)	4/26/84
1-EN-SV0-45+	82-057	19.8	16.0 (80.6)	ND (0.54) ^c	ND (0.027)	ND (0.034)	4/26/84
2-EN-SV0-0-14	82-058	21.2	14.7 (69.3)	26	1.2	1.7	6/14/84
2-EN-SV0-15-44	82-059	21.4	17.0 (83.2)	7.9	0.37	0.45	6/14/84
2-EN-SV0-45+	82-060	26.2	21.8 (83.2)	4.5	0.17	0.20	6/14/84
3-EN-SV0-45+	82-062	23.2	19.8 (85.3)	14	0.62	0.73	6/16/84
1-WN-SV0-0-14	82-063	23.4	14.8 (63.1)	2.1	0.091	0.14	5/10/84
1-WN-SV0-15-44	82-064	20.6	15.7 (76.2)	ND (0.20)	ND (0.010)	ND (0.013)	5/11/84
1-WN-SV0-45+	82-065	22.5	20.2 (89.8)	2.4	0.11	0.12	5/10/84
2-WN-SV0-45+	82-066	21.4	17.2 (80.4)	1.5	0.070	0.086	6/15/84

Table 30 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analysis Date
1-SA-SVO-0-14	82-067	20.7	16.8 (83.9)	ND (1.8) ^c	ND (0.088)	ND (0.11)	4/26/84
1-SA-SVO-15-44	82-068	26.4	22.8 (86.4)	ND (3.3) ^c	ND (0.14)	ND (0.14)	4/24/84
1-SA-SVO-45+	82-069	20.0	16.5 (82.5)	ND (1.8) ^c	ND (0.090)	ND (0.11)	4/24/84
2-SA-SVO-0-14	82-070	19.1	13.2 (69.1)	2.0	0.11	0.15	4/24/84
2-SA-SVO-15-44	82-071	19.5	17.4 (89.3)	1.7	0.088	0.098	6/15/84
2-SA-SVO-45+	82-072	26.1	21.9 (83.9)	11	0.44	0.52	6/14/84
3-SA-SVO-15-44	82-073	17.9	12.6 (70.4)	13	0.72	1.0	6/13/84
3-SA-SVO-45+	82-074	18.0	15.6 (86.7)	ND (1.2) ^c	ND (0.064)	ND (0.074)	6/16/84
4-SA-SVO-45+	82-076	17.6	12.4 (70.5)	ND (0.36) ^c	ND (0.020)	ND (0.029)	6/16/84
1-ES-SVO-0-14	82-077	28.1	21.7 (77.2)	3.4	0.12	0.16	5/14/84
1-ES-SVO-15-44	82-078	19.9	16.6 (83.2)	2.8	0.14	0.17	5/14/84
2-ES-SVO-15-44	82-080	25.7	22.5 (87.5)	ND (0.56) ^c	ND (0.022)	ND (0.025)	6/15/84
2-ES-SVO-45+	82-081	21.1	16.5 (78.2)	ND (0.20)	ND (0.009)	ND (0.012)	6/16/84
1-WS-SVO-0-14	82-082	11.1	7.5 (67.6)	17	1.5	2.2	5/14/84
1-WS-SVO-15-44	82-083	22.7	19.7 (86.7)	ND (2.5) ^c	ND (0.11)	ND (0.12)	5/9/84
1-WS-SVO-45+	82-084	22.4	21.2 (94.6)	.51	2.3	2.4	5/10/84
2-WS-SVO-15-44	82-085	21.9	18.9 (86.3)	ND (0.20)	ND (0.009)	ND (0.011)	6/15/84

^aThe estimated limit of detection (LOD) for this compound is 0.20 µg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LQO) for this compound is 0.80 µg/sample ($10 \times S/N$).

^bND = not detected.

Value in parentheses is the estimated limit of detection (LOD). tr = trace.

^cThe compound is present at a level between LOD and LOQ.

The concentration of the analyte in the sample was less than the observed concentration in the respective method blank. The value reported as the detection limit corresponds to the blank value.

Table 31. Data Report - Di-n-octyl Phthalate (CAS No. 117-84-0) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg)	Concentration - wet tissue (µg/g)	Concentration - wet extractable lipid (µg/g)	Analysis Date
1-MO-SVO-15-44	82-037	18.3	13.6 (74.1)	ND (0.20) ^c	ND (0.011)	ND (0.015)	4/24/84
1-MO-SVO-45+	82-041	21.0	17.7 (84.3)	ND (12.2) ^c	ND (0.58)	ND (0.69)	5/14/84
1-NE-SVO-0-14	82-042	19.1	10.5 (55.1)	tr 0.69	tr 0.036	tr 0.066	4/23/84
1-NE-SVO-15-44	82-043	21.9	19.2 (87.6)	tr 0.24	tr 0.011	tr 0.013	4/10/84
1-NE-SVO-45+	82-044	26.7	21.1 (79.2)	ND (0.20)	ND (0.007)	ND (0.009)	4/23/84
1-PA-SVO-0-14	82-046	19.7	12.4 (62.9)	ND (2.3) ^c	ND (0.12)	ND (0.13)	4/24/84
1-PA-SVO-15-44	82-047	21.6	14.7 (68.0)	ND (1.4) ^c	ND (0.063)	ND (0.092)	4/27/84
1-PA-SVO-45+	82-048	22.0	19.2 (87.1)	16	0.74	0.85	4/25/84
1-MA-SVO-0-14	82-049	23.0	17.8 (77.5)	ND (0.20)	ND (0.009)	ND (0.011)	4/23/84
1-MA-SVO-15-44	82-050	25.2	20.3 (80.7)	1.1	0.045	0.056	4/12/84
1-MA-SVO-45+	82-051	16.2	13.4 (82.5)	tr 0.21	tr 0.013	tr 0.016	4/24/84
2-MA-SVO-0-14	82-052	20.2	17.1 (84.7)	ND (0.20)	ND (0.010)	ND (0.012)	6/13/84
2-MA-SVO-15-44	82-053	26.1	20.4 (78.2)	ND (0.20)	ND (0.008)	ND (0.010)	6/13/84
2-MA-SVO-45+	82-054	18.0	15.1 (83.9)	ND (0.89) ^c	ND (0.049)	ND (0.059)	6/13/84
1-EN-SVO-0-14	82-055	18.1	8.8 (48.6)	ND (2.0)	ND (0.11)	ND (0.23)	4/25/84
1-EN-SVO-15-44	82-056	21.6	16.3 (75.5)	ND (0.82) ^c	ND (0.038)	ND (0.050)	4/26/84
1-EN-SVO-45+	82-057	19.8	16.0 (80.6)	ND (0.98) ^c	ND (0.049)	ND (0.061)	4/26/84
2-EN-SVO-0-14	82-058	21.2	14.7 (69.3)	ND (3.3) ^c	ND (0.15)	ND (0.22)	6/14/84
2-EN-SVO-15-44	82-059	21.4	17.8 (83.2)	6.1	0.28	0.34	6/14/84
2-EN-SVO-45+	82-060	26.2	21.8 (83.2)	ND (0.20)	ND (0.007)	ND (0.009)	6/14/84
3-EN-SVO-45+	82-062	23.2	19.8 (85.3)	1.9	0.082	0.096	6/16/84
1-WN-SVO-0-14	82-063	23.4	14.8 (63.1)	ND (0.20) ^c	ND (0.009)	ND (0.014)	5/10/84
1-WN-SVO-15-44	82-064	20.6	15.7 (76.2)	ND (1.7) ^c	ND (0.083)	ND (0.11)	5/11/84
1-WN-SVO-45+	82-065	22.5	20.2 (89.8)	23	1.0	1.1	5/10/84
2-WN-SVO-45+	82-066	21.4	17.2 (80.4)	ND (3.5) ^c	ND (0.16)	ND (0.20)	6/15/84

Table 31 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis Date
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	ND (0.20)	ND (0.010)	ND (0.012)	4/26/84
1-SA-SV0-15-44	82-068	26.4	22.8 (85.4)	ND (6.8)	ND (0.26)	ND (0.30)	4/24/84
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	ND (0.20)	ND (0.10)	ND (0.012)	4/24/84
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	7.9	0.42	0.60	6/15/84
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	ND (0.20)	ND (0.010)	ND (0.011)	6/14/84
2-SA-SV0-45+	82-072	26.1	21.9 (83.9)	ND (0.74) ^c	ND (0.028)	ND (0.034)	6/13/84
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	ND (1.9) ^c	ND (0.11)	ND (0.15)	6/16/84
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	tr 0.27	tr 0.015	tr 0.017	6/16/84
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	ND (0.27) ^c	ND (0.015)	ND (0.022)	6/18/84
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	ND (2.0)	ND (0.073)	ND (0.094)	5/14/84
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	2.1	0.11	0.13	5/14/84
2-ES-SV0-15-44	82-080	25.7	22.5 (87.5)	ND (0.20)	ND (0.011)	ND (0.012)	6/15/84
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	ND (0.20)	ND (0.009)	ND (0.012)	6/16/84
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	19	1.7	2.5	5/14/84
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	5.8	0.26	0.29	5/9/84
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	tr 0.33	tr 0.015	tr 0.015,	5/10/84
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	ND (4.4) ^c	ND (0.20)	ND (0.23)	6/15/84

a The estimated limit of detection (LOD) for this compound is 0.20 μg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LOQ) for this compound is 0.80 μg/sample ($10 \times S/N$).

b ND = not detected. Value in parentheses is the estimated limit of detection (LOD).

c The compound is present at a level between LOD and LOQ. The concentration of the analyte in the sample was less than the observed concentration in the respective method blank. The value reported as the detection limit corresponds to the blank value.

Table 32. Data Report - Butyl Benzyl Phthalate (CAS No. 85-68-7) - FY 82 Composite Adipose Tissue Samples

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (μg) ^a	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis date
1-MO-SV0-15-44	82-037	18.3	13.6 (74.1)	3.6	0.20	0.27	4/24/84
1-MO-SV0-45+	82-041	21.0	17.7 (84.3)	7.8	0.37	0.44	5/14/84
1-NE-SV0-0-14	82-042	19.1	10.5 (55.1)	ND (0.20)	ND (0.010)	ND (0.019)	4/23/84
1-NE-SV0-15-44	82-043	21.9	19.2 (87.6)	ND (0.20)	ND (0.009)	ND (0.010)	4/10/84
1-NE-SV0-45+	82-044	26.7	21.1 (79.2)	ND (0.20)	ND (0.007)	ND (0.009)	4/23/84
1-PA-SV0-0-14	82-046	19.7	12.4 (62.9)	ND (0.20)	ND (0.010)	ND (0.016)	4/24/84
1-PA-SV0-15-44	82-047	21.6	14.7 (68.0)	ND (0.20)	ND (0.009)	ND (0.014)	4/27/84
1-PA-SV0-45+	82-048	22.0	19.2 (87.1)	1.7	0.077	0.089	4/25/84
1-MA-SV0-0-14	82-049	23.0	17.8 (77.5)	ND (0.20)	ND (0.009)	ND (0.011)	4/23/84
1-MA-SV0-15-44	82-050	25.2	20.3 (80.7)	0.82	0.033	0.040	4/12/84
1-MA-SV0-45+	82-051	16.2	13.4 (82.5)	ND (0.20)	ND (0.012)	ND (0.015)	4/24/84
2-MA-SV0-0-14	82-052	20.2	17.1 (84.7)	8.4	0.42	0.024	6/13/84
2-MA-SV0-15-44	82-053	26.1	20.4 (78.2)	9.2	0.35	0.45	6/13/84
2-MA-SV0-45+	82-054	18.0	15.1 (83.9)	6.0	0.33	0.40	6/13/84
1-EN-SV0-0-14	82-055	18.1	8.8 (48.6)	1.1	0.060	0.13	4/25/84
1-EN-SV0-15-44	82-056	21.6	16.3 (75.5)	ND (0.20)	ND (0.009)	ND (0.012)	4/26/84
1-EN-SV0-45+	82-057	19.8	16.0 (80.6)	tr	0.012	tr	4/26/84
2-EN-SV0-0-14	82-058	21.2	14.7 (69.3)	tr	0.015	tr	6/14/84
2-EN-SV0-15-44	82-059	21.4	17.8 (83.2)	15	0.71	0.85	6/14/84
2-EN-SV0-45+	82-060	26.2	21.8 (83.2)	7.0	0.27	0.32	6/14/84
3-EN-SV0-45+	82-062	23.2	19.8 (85.3)	1.7	0.072	0.085	6/16/84
1-WN-SV0-0-14	82-063	23.4	14.8 (63.1)	3.0	0.13	0.20	5/10/84
1-WN-SV0-15-44	82-064	20.6	15.7 (76.2)	1.9	0.092	0.12	5/11/84
1-WN-SV0-45+	82-065	22.5	20.2 (89.8)	6.6	0.29	0.33	5/10/84
2-WN-SV0-45+	82-066	21.4	17.2 (80.4)	4.3	0.20	0.25	6/15/84

Table 32 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg)	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analysis date
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	tr	0.58	tr	0.033
1-SA-SV0-15-44	82-068	26.4	22.8 (86.4)	tr	0.076	tr	0.088
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	1.6	0.080	4/24/84	4/24/84
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	4.2	0.22	0.32	6/15/84
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	3.6	0.19	0.21	6/14/84
2-SA-SV0-45+	82-072	26.1	21.9 (83.9)	10	0.039	0.047	6/13/84
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	tr	0.019	tr	0.022
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	tr	0.20	tr	0.013
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	ND (0.20)	ND (0.011)	ND (0.016)	6/18/84
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	7.6	0.27	0.35	5/14/84
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	9.4	0.47	0.57	5/14/84
2-ES-SV0-15-44	82-080	25.7	22.5 (87.5)	ND (0.20)	ND (0.008)	ND (0.009)	6/15/84
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	ND (0.20)	ND (0.009)	ND (0.012)	6/16/84
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	13	1.2	1.7	5/14/84
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	2.1	0.092	0.011	5/9/84
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	35	1.6	1.7	5/10/84
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	2.4	0.11	0.13	6/15/84

^aThe estimated limit of detection (LOD) is 0.20 µg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LOQ) is 0.80 µg/sample ($10 \times S/N$).

^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

Table 33. Data Report - Naphthalene (CAS No. 91-20-3) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - wet extractable lipid (µg/g)	Analysis date
1-M0-SV0-0-14	82-036	9.0	5.6 (62.3)	ND (0.20)	ND (0.022)	ND (0.036)	4/19/84
1-M0-SV0-15-44	82-037	18.3	13.6 (74.1)	ND (0.20)	ND (0.011)	ND (0.015)	4/19/84
1-M0-SV0-45+	82-041	21.0	17.7 (84.3)	ND (0.20)	ND (0.010)	ND (0.011)	5/10/84
1-NE-SV0-0-14	82-042	19.1	10.5 (55.1)	ND (0.20)	ND (0.010)	ND (0.019)	4/6/84
1-NE-SV0-15-44	82-043	21.9	19.2 (87.6)	tr 0.60	tr 0.027	tr 0.031	4/5/84
1-NE-SV0-45+	82-044	26.7	21.1 (79.2)	ND (0.20)	ND (0.010)	ND (0.016)	4/6/84
1-PA-SV0-0-14	82-046	19.7	12.4 (62.9)	ND (0.20)	ND (0.007)	ND (0.016)	4/19/84
1-PA-SV0-45+	82-048	22.0	19.2 (87.1)	tr 0.20	tr 0.010	tr 0.010	4/19/84
1-MA-SV0-0-14	82-049	23.0	17.8 (77.5)	ND (0.20)	ND (0.009)	ND (0.011)	4/16/84
1-MA-SV0-15-44	82-050	25.2	20.3 (80.7)	ND (0.20)	ND (0.008)	ND (0.010)	4/15/84
1-MA-SV0-45+	82-051	16.2	13.4 (82.5)	ND (0.20)	ND (0.012)	ND (0.015)	6/1/84
2-MA-SV0-0-14	82-052	20.2	17.1 (84.7)	ND (0.20)	ND (0.010)	ND (0.012)	6/12/84
2-MA-SV0-15-44	82-053	26.1	20.4 (78.2)	tr 0.22	tr 0.008	tr 0.011	6/12/84
2-MA-SV0-45+	82-054	18.0	15.1 (83.9)	tr 0.29	tr 0.016	tr 0.019	6/12/84
1-EN-SV0-0-14	82-055	18.1	8.8 (48.6)	ND (0.20)	ND (0.011)	ND (0.023)	4/19/84
1-EN-SV0-15-44	82-056	21.6	16.3 (75.5)	tr 0.21	tr 0.010	tr 0.013	4/20/84
1-EN-SV0-45+	82-057	19.8	16.0 (80.6)	tr 0.25	tr 0.013	tr 0.016	4/20/84
2-EN-SV0-0-14	82-058	21.2	14.7 (69.3)	ND (0.20)	ND (0.009)	ND (0.014)	6/5/84
2-EN-SV0-15-44	82-059	21.4	17.8 (83.2)	ND (0.20)	ND (0.009)	ND (0.011)	6/5/84
2-EN-SV0-45+	82-060	26.2	21.8 (83.2)	tr 0.32	tr 0.012	tr 0.015	6/4/84
3-EN-SV0-15-44	82-061	20.2	16.8 (83.2)	ND (0.20)	ND (0.010)	ND (0.012)	6/5/84
3-EN-SV0-45+	82-062	23.2	19.8 (85.3)	ND (0.20)	ND (0.009)	ND (0.010)	6/6/84
1-WN-SV0-0-14	82-063	23.4	14.8 (63.1)	tr 0.20	tr 0.008	tr 0.014	5/7/84
1-WN-SV0-15-44	82-064	20.6	15.7 (76.2)	ND (0.20)	ND (0.010)	ND (0.013)	5/4/84
1-WN-SV0-45+	82-065	22.5	20.2 (89.8)	tr 0.30	tr 0.013	tr 0.015	5/7/84
2-WN-SV0-45+	82-066	21.4	17.2 (80.4)	ND (0.20)	ND (0.009)	ND (0.012)	6/5/84



Table 33 (continued)

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis date
1-SA-SVO-0-14	82-067	20.7	16.8 (83.9)	1.1	0.051	0.063	5/11/84
1-SA-SVO-15-44	82-068	26.4	22.8 (86.4)	ND (0.20)	ND (0.098)	ND (0.009)	4/20/84
1-SA-SVO-45+	82-069	20.0	16.5 (82.5)	tr 0.48	tr 0.024	tr 0.029	6/5/84
2-SA-SVO-0-14	82-070	19.1	13.2 (69.1)	tr 0.41	tr 0.021	tr 0.031	6/5/84
2-SA-SVO-15-44	82-071	19.5	17.4 (89.3)	ND (0.20)	ND (0.010)	ND (0.011)	6/18/84
3-SA-SVO-15-44	82-073	17.9	12.6 (70.4)	tr 0.67	tr 0.037	tr 0.053	6/5/84
3-SA-SVO-45+	82-074	18.0	15.6 (86.7)	tr 0.41	tr 0.023	tr 0.026	6/12/84
4-SA-SVO-15-44	82-075	18.2	13.1 (72.0)	ND (0.20)	ND (0.011)	ND (0.015)	6/6/84
4-SA-SVO-45+	82-076	17.6	12.4 (70.5)	ND (0.20)	ND (0.011)	ND (0.016)	6/12/84
1-ES-SVO-0-14	82-077	28.1	21.7 (77.2)	ND (0.20)	ND (0.007)	ND (0.009)	6/1/84
1-ES-SVO-15-44	82-078	19.9	16.6 (83.2)	tr 0.27	tr 0.014	tr 0.016	5/10/84
1-ES-SVO-45+	82-079	20.7	18.3 (88.4)	ND (0.20)	ND (0.010)	ND (0.011)	5/10/84
2-ES-SVO-45+	82-081	21.1	16.5 (78.2)	tr 0.36	tr 0.17	tr 0.022	6/6/84
1-WS-SVO-0-14	82-082	11.1	7.5 (67.6)	tr 0.27	tr 0.024	tr 0.036	5/8/84
1-WS-SVO-15-44	82-083	22.7	19.7 (86.7)	tr 0.52	tr 0.023	tr 0.026	5/4/84
1-WS-SVO-45+	82-084	22.4	21.2 (94.6)	ND (0.20)	ND (0.009)	ND (0.009)	5/7/84
2-WS-SVO-15-44	82-085	21.9	18.9 (86.3)	ND (0.20)	ND (0.009)	ND (0.011)	6/18/84

^aThe estimated limit of detection (LOD) for this compound is 0.20 μg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LOQ) for this compound is 0.80 μg/sample ($10 \times S/N$).

^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

Table 34. Data Report - Phenanthrene (CAS No. 85-01-8) - FY82 Composite Adipose Tissue Samples^a

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (µg) ^b	Concentration - wet tissue (µg/g)	Concentration - extractable lipid (µg/g)	Analyst's date
1-M0-SV0-0-14	82-036	9.0	5.6 (62.3)	ND (0.20)	ND (0.022)	ND (0.035)	4/19/84
1-M0-SV0-15-44	82-037	18.3	13.6 (74.1)	ND (0.20)	ND (0.011)	ND (0.015)	4/19/84
1-M0-SV0-45+	82-041	21.0	17.7 (84.3)	ND (0.20)	ND (0.010)	ND (0.011)	5/10/84
1-NE-SV0-0-14	82-042	19.1	10.5 (55.1)	ND (0.20)	ND (0.010)	ND (0.019)	4/6/84
1-NE-SV0-15-44	82-043	21.9	19.2 (87.6)	ND (0.20)	ND (0.009)	ND (0.010)	4/15/84
1-NE-SV0-45+	82-044	26.7	21.1 (79.2)	ND (0.20)	ND (0.007)	ND (0.009)	4/16/84
1-PA-SV0-0-14	82-046	19.7	12.4 (62.9)	ND (0.20)	ND (0.010)	ND (0.016)	4/19/84
1-PA-SV0-45+	82-048	22.0	19.2 (87.1)	ND (0.20)	ND (0.009)	ND (0.010)	4/19/84
1-MA-SV0-0-14	82-049	23.0	17.8 (77.5)	ND (0.20)	ND (0.009)	ND (0.010)	4/6/84
1-MA-SV0-15-44	82-050	25.2	20.3 (80.7)	tr 0.48	tr 0.019	tr 0.024	4/5/84
1-MA-SV0-45+	82-051	16.2	13.4 (82.5)	ND (0.20)	ND (0.012)	ND (0.015)	5/1/84
2-MA-SV0-0-14	82-052	20.2	17.1 (84.7)	ND (0.20)	ND (0.010)	ND (0.012)	6/12/84
2-MA-SV0-15-44	82-053	26.1	20.4 (78.2)	ND (0.20)	ND (0.008)	ND (0.010)	6/12/84
2-MA-SV0-45+	82-054	18.0	15.1 (83.9)	ND (0.20)	ND (0.011)	ND (0.013)	6/12/84
1-EN-SV0-0-14	82-055	18.1	8.8 (48.6)	ND (0.20)	ND (0.011)	ND (0.023)	4/19/84
1-EN-SV0-15-44	82-056	21.6	16.3 (75.5)	ND (0.20)	ND (0.009)	ND (0.012)	4/20/84
1-EN-SV0-45+	82-057	19.8	16.0 (80.6)	ND (0.20)	ND (0.010)	ND (0.013)	4/20/84
2-EN-SV0-0-14	82-058	21.2	14.7 (69.3)	tr 0.34	tr 0.016	tr 0.023	6/5/84
2-EN-SV0-15-44	82-059	21.4	17.8 (83.2)	ND (0.20)	ND (0.009)	ND (0.011)	6/5/84
2-EN-SV0-45+	82-060	26.2	21.8 (83.2)	ND (0.20)	ND (0.008)	ND (0.009)	6/4/84
3-EN-SV0-15-44	82-061	20.2	16.8 (83.2)	ND (0.20)	ND (0.010)	ND (0.012)	6/5/84
3-EN-SV0-45+	82-062	23.2	19.8 (85.3)	ND (0.20)	ND (0.009)	ND (0.010)	6/6/84
1-WN-SV0-0-14	82-063	23.4	14.8 (63.1)	ND (0.20)	ND (0.009)	ND (0.014)	5/7/84
1-WN-SV0-15-44	82-064	20.6	15.7 (76.2)	ND (0.20)	ND (0.010)	ND (0.013)	5/4/84
1-WN-SV0-45+	82-065	22.5	20.2 (89.8)	ND (0.20)	ND (0.009)	ND (0.010)	5/7/84
2-WN-SV0-45+	82-066	21.4	17.2 (80.4)	ND (0.20)	ND (0.009)	ND (0.012)	6/5/84

Table 34 (continued).

Sample composite number	MRI sample number	Wet tissue weight - g	Extractable lipid weight - g (%)	Total mass detected (μg) ^b	Concentration - wet tissue (μg/g)	Concentration - extractable lipid (μg/g)	Analysis date
1-SA-SV0-0-14	82-067	20.7	16.8 (83.9)	ND (0.20)	ND (0.010)	ND (0.012)	5/11/84
1-SA-SV0-15-44	82-068	26.4	22.8 (82.5)	tr 0.32	tr 0.012	tr 0.015	4/20/84
1-SA-SV0-45+	82-069	20.0	16.5 (82.5)	ND (0.20)	ND (0.010)	ND (0.012)	4/20/84
2-SA-SV0-0-14	82-070	19.1	13.2 (69.1)	ND (0.20)	ND (0.010)	ND (0.012)	4/20/84
2-SA-SV0-15-44	82-071	19.5	17.4 (89.3)	ND (0.20)	ND (0.010)	ND (0.015)	6/5/84
3-SA-SV0-15-44	82-073	17.9	12.6 (70.4)	ND (0.20)	ND (0.010)	ND (0.011)	6/18/84
3-SA-SV0-45+	82-074	18.0	15.6 (86.7)	tr 0.20	tr 0.011	tr 0.016	6/5/84
4-SA-SV0-15-44	82-075	18.2	13.1 (72.0)	ND (0.20)	ND (0.011)	ND (0.013)	6/12/84
4-SA-SV0-45+	82-076	17.6	12.4 (70.5)	ND (0.20)	ND (0.011)	ND (0.015)	6/6/84
ND (0.016)				ND (0.20)	ND (0.011)	ND (0.016)	6/12/84
1-ES-SV0-0-14	82-077	28.1	21.7 (77.2)	tr 0.20	tr 0.007	tr 0.009	6/1/84
1-ES-SV0-15-44	82-078	19.9	16.6 (83.2)	ND (0.20)	ND (0.010)	ND (0.012)	5/10/84
1-ES-SV0-45+	82-079	20.7	18.3 (88.4)	tr 0.31	tr 0.015	tr 0.017	5/10/84
2-ES-SV0-45+	82-081	21.1	16.5 (78.2)	ND (0.20)	ND (0.009)	ND (0.012)	6/6/84
1-WS-SV0-0-14	82-082	11.1	7.5 (67.6)	ND (0.20)	ND (0.018)	ND (0.026)	5/8/84
1-WS-SV0-15-44	82-083	22.7	19.7 (86.7)	ND (0.20)	ND (0.009)	ND (0.010)	5/14/84
1-WS-SV0-45+	82-084	22.4	21.2 (94.6)	ND (0.20)	ND (0.009)	ND (0.009)	5/7/84
2-WS-SV0-15-44	82-085	21.9	18.9 (86.3)	ND (0.20)	ND (0.009)	ND (0.011)	6/18/84

^aThe estimated limit of detection (LOD) for this compound is 0.20 μg/sample ($2.5 \times S/N$). The estimated limit of quantitation (LQ) for this compound is 0.80 μg/sample ($10 \times S/N$).
^bND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LQ.

Table 35. Compounds Not Detected in the FY82 Composite Specimens

Analytes	Estimated detection level ($\mu\text{g/g}$) for 20-g sample ^a
<u>Organochlorine pesticides</u>	
<u>$\text{o},\text{p}'\text{-DDT}$</u>	0.010
<u>$\text{o},\text{p}'\text{-DDE}$</u>	0.010
<u>$\text{p},\text{p}'\text{-DDD}$</u>	0.010
<u>$\text{o},\text{p}'\text{-DDD}$</u>	0.010
α -BHC	0.010
δ -BHC	0.010
Aldrin	0.010
Heptachlor	0.010
Endrin	0.050
γ -Chlordane	0.010
<u>Polychlorinated biphenyls, PCBs</u>	
Monochlorobiphenyl	0.010
Dichlorobiphenyl	0.010
<u>Chlorobenzenes</u>	
Trichlorobenzene (1,2,3-; 1,3,5-)	0.010
Tetrachlorobenzene (1,2,3,4-; 1,2,3,5-; 1,2,4,5-)	0.010
Pentachlorobenzene	0.010
<u>Phthalate esters</u>	
Dimethyl phthalate	0.010
<u>Phosphate triesters</u>	
tris-(Dichloropropyl)phosphate ester	0.050
Tributoxyethyl phosphate ester	0.050
<u>Polynuclear aromatic hydrocarbons, PAH</u>	
Acenaphthylene	0.010
Acenaphthene	0.010
Fluorene	0.010
Fluoranthene	0.010
Chrysene	0.010

Table 35 (continued)

Analytes	Estimated detection level (µg/g) for 20-g sample ^a
<u>Polybrominated biphenyls, PBBs</u>	
Bromobiphenyl	0.010
Dibromobiphenyl	0.010
Tribromobiphenyl	0.025
Tetrabromobiphenyl	0.050
Pentabromobiphenyl	0.050
Hexabromobiphenyl	0.100
<u>Polychlorinated diphenyl ethers, PCDEs</u>	
Chlorodiphenyl ether	0.010
Pentachlorodiphenyl ether	0.050
Decachlorodiphenyl ether	0.100
<u>Polychlorinated terphenyls, PCTs</u>	
Chloroterphephenyl	0.010
Dichloroterphephenyl	0.010
Trichloroterphephenyl	0.025
<u>Chlorophenols</u>	
Dichloropheno1	0.010
Trichloropheno1	0.025
Pentachloropheno1	0.050

^aThe estimated detection limits for polychlorinated compounds represent response from a single isomer rather than the entire homolog.

As indicated earlier in this section, mass spectra of the components in the sample extracts were compared to the NBS mass spectral library. This approach yielded the identification of biogenic materials, particularly fatty acids and cholesterol related compounds, although many of the peaks remain unidentified. The importance of characterizing these unidentified peaks is recognized to be necessary in achieving the goals of the broad scan analysis program. The effort to assign identifications to these data points is currently being addressed under a separate work assignment for OTS (Contract 68-02-4252, Work Assignment 23).

2. HRGC/ECD Analysis

The sample extracts analyzed by HRGC/MS were also screened by HRGC/ECD. Figures 17 and 18 provide comparison of the HRGC/ECD and HRGC/MS responses of the 6% and 15/50% Florisil fraction extracts of a specific composite. It should be noted that the HRGC/ECD analysis required that the extracts be diluted by a factor of 10 before analysis. The HRGC/ECD screen was completed using the same HRGC separation parameters (column dimension, temperature program, etc.) as were used to achieve the HRGC/MS analysis.

Figures 19 and 20 provide examples of the HRGC/ECD analysis of the 6% and 15/50% Florisil column extracts from three age groups within a specific census division. The chromatograms for the 6% fraction Florisil fraction demonstrate response corresponding to the internal standards (dichloro- and octachloronaphthalene) the surrogate compounds, organochlorine pesticides, and PCBs. Figures 21 to 23 are provided as a matter of reference to determine the elution characteristics of specific compounds and compound classes with respect to the response noted for the 6% Florisil fraction.

Much of the response noted for the HRGC/ECD chromatogram in the range of 0 to 15 min for the 15/50% Florisil fraction is attributed to background from solvents. Figure 24 is an example of the HRGC/ECD response noted for the 6% and 15/50% Florisil fractions of a method blank. It should be noted that the response from the 6% Florisil fraction corresponds with the elution of the surrogates and internal standards.

The HRGC/ECD chromatograms are useful for determining whether additional compounds of interest may have been overlooked in the HRGC/MS interpretation. As an example, a review of the 15/50% Florisil fractions analyzed by HRGC/ECD indicated that dieldrin is present in practically all of the FY82 NHATS composites based on the response at a specific retention time relative to the two internal standards. The increased number of positives detected by HRGC/ECD as compared to the HRGC/MS analysis of the same extracts is due to the differences in method sensitivity. An increased number of positive responses by HRGC/MS for dieldrin and the other chlorinated pesticides would be expected if the data acquisition parameters were changed from full scan to a SIM technique or other mass spectrometry techniques such as negative chemical ionization (NCI) or mass spectrometry/mass spectrometry (MS/MS). The selection of HRGC/MS-SIM, however, would restrict the broad scan analysis approach. A possible approach for future NHATS monitoring programs might combine the HRGC/ECD analysis to provide identification and quantitation of specific organochlorine pesticides, chlorobenzenes, and PCB isomers and HRGC/MS-SIM or to generate data on specific target analytes or compound classes.

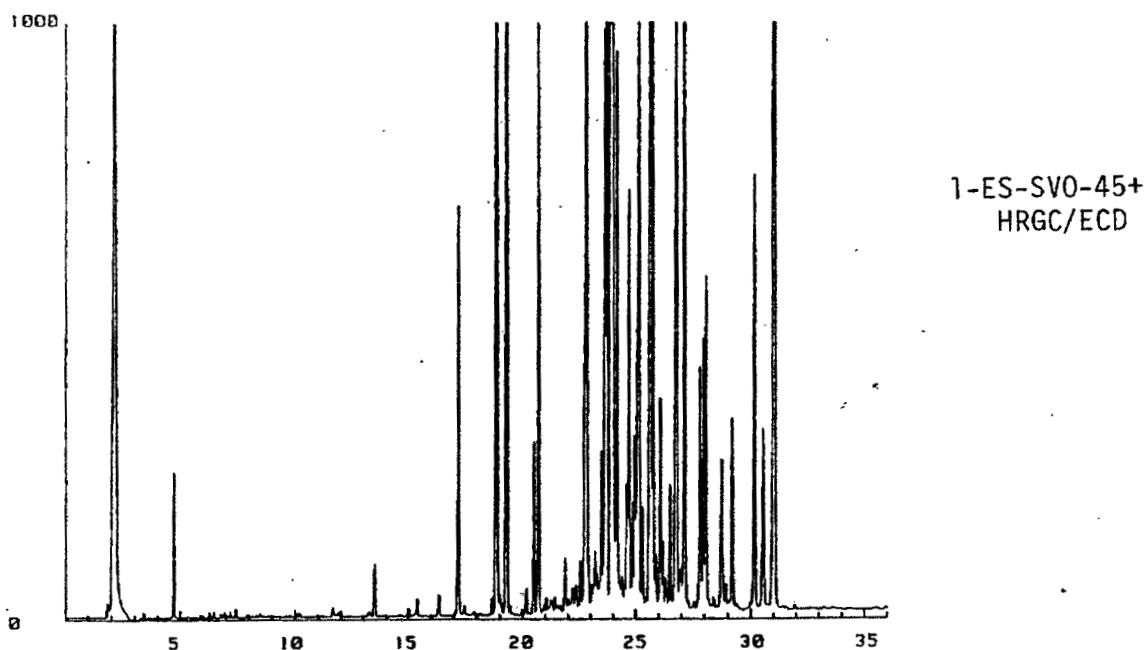
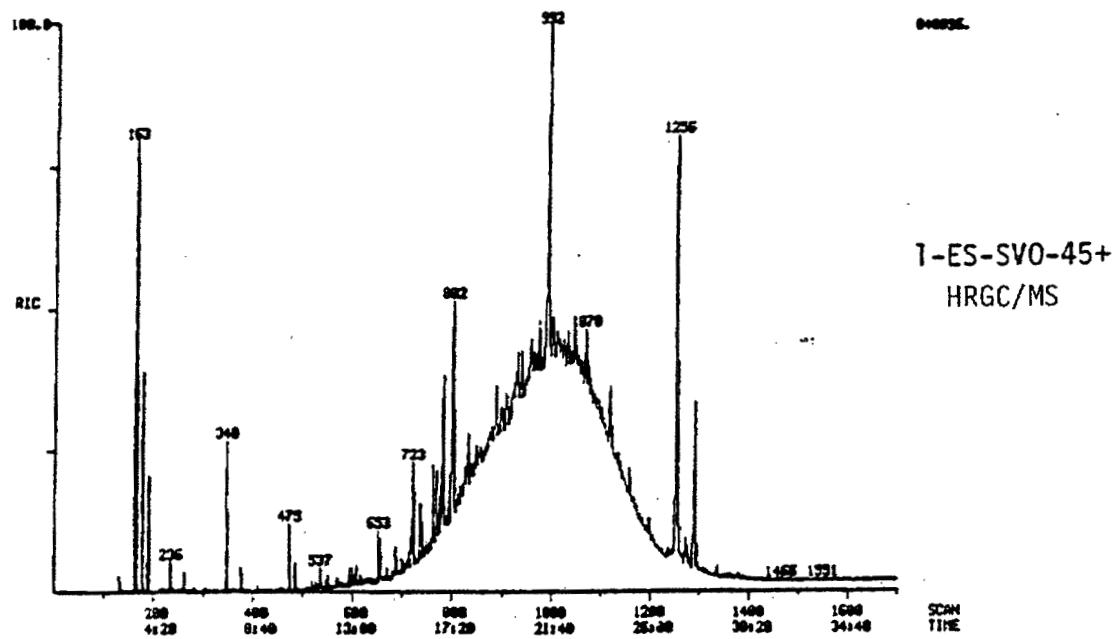


Figure 17. HRGC/MS and HRGC/ECD chromatograms of the 6% diethyl ether-Florisil fraction of the 45-plus age category of the East South Central census division.

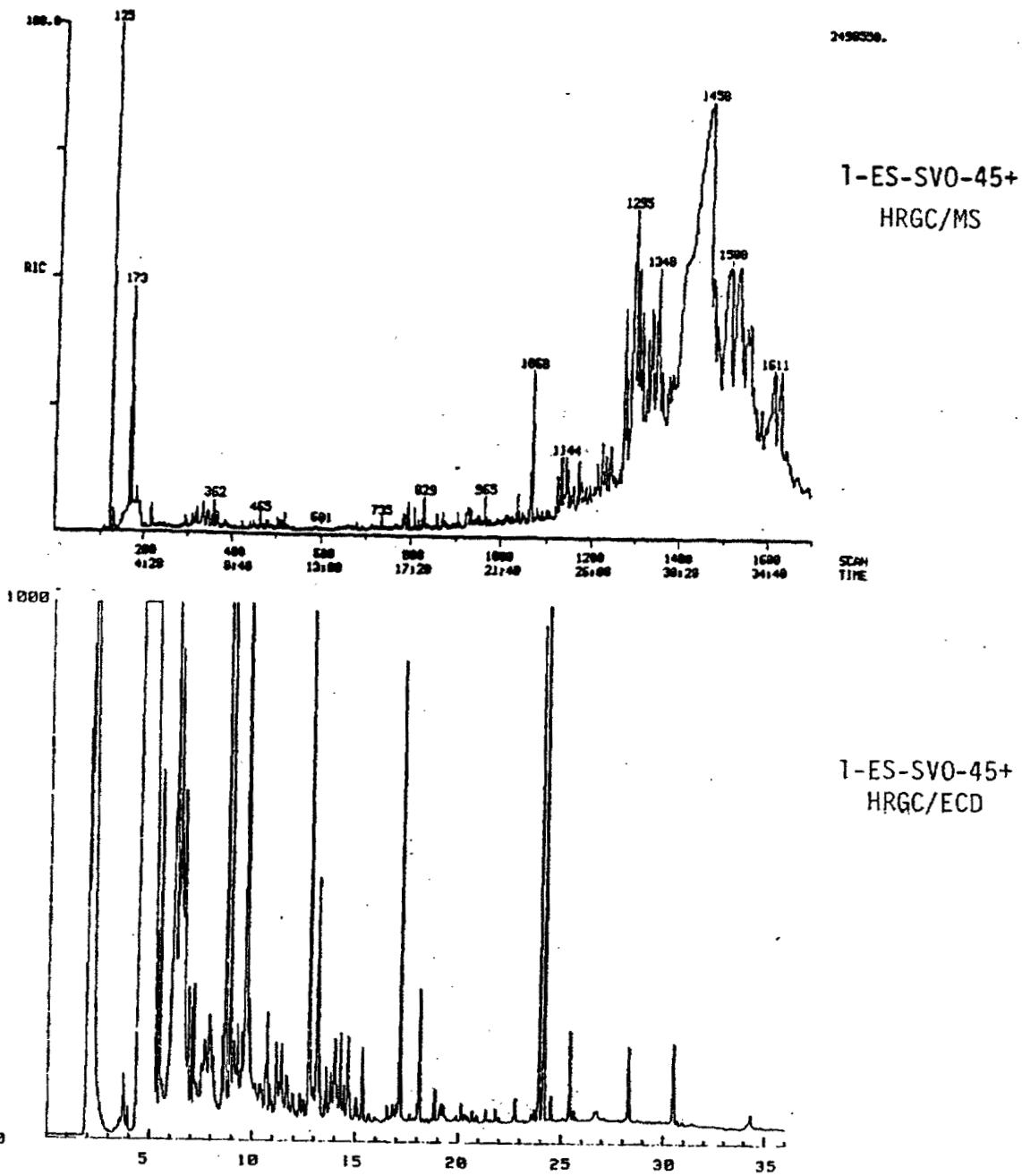


Figure 18. HRGC/MS and HRGC/ECD chromatograms of the 15/50% diethyl ether Florisil fraction of the 45-plus age category of the East South Central census division.

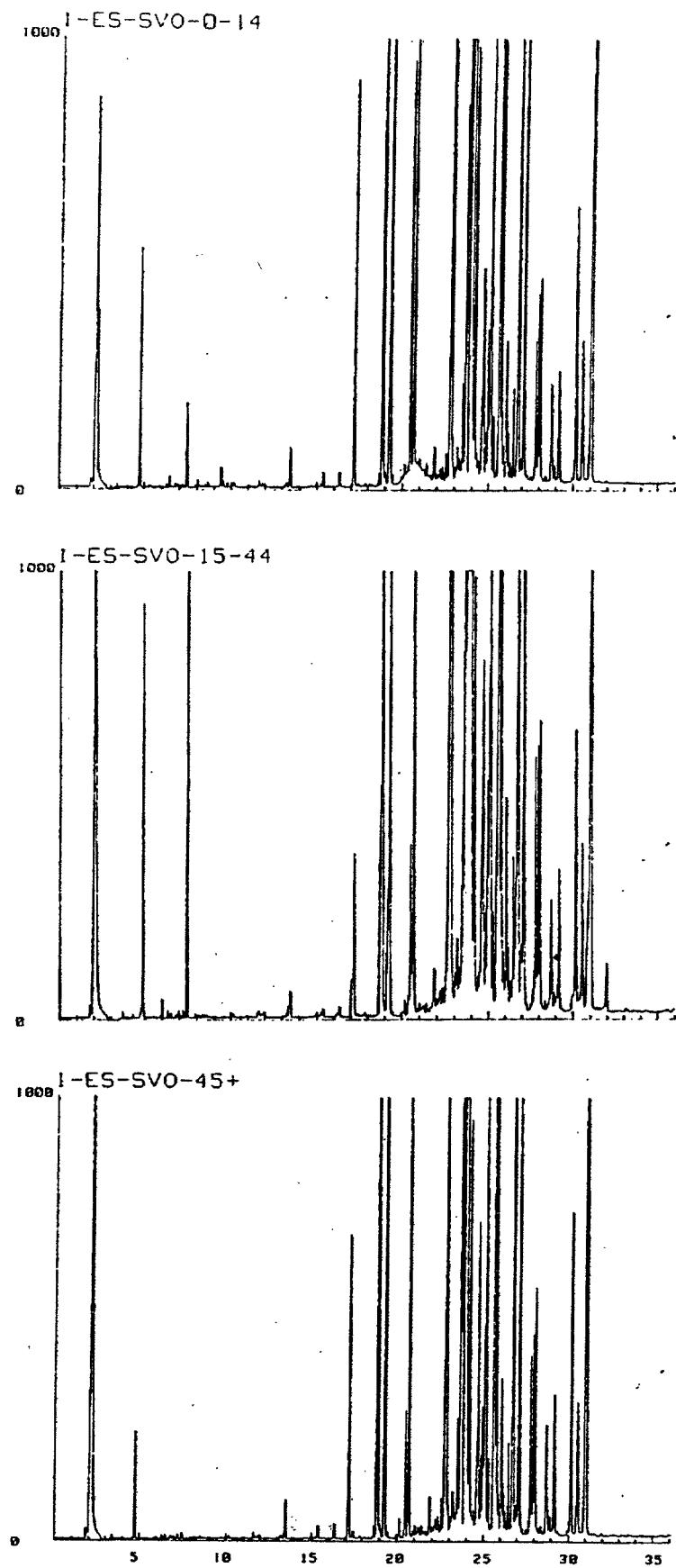


Figure 19. HRGC/ECD chromatogram from the analysis of the 6% diethyl ether Florisil fraction of the three age group composites from the East South Central (ES) census division.

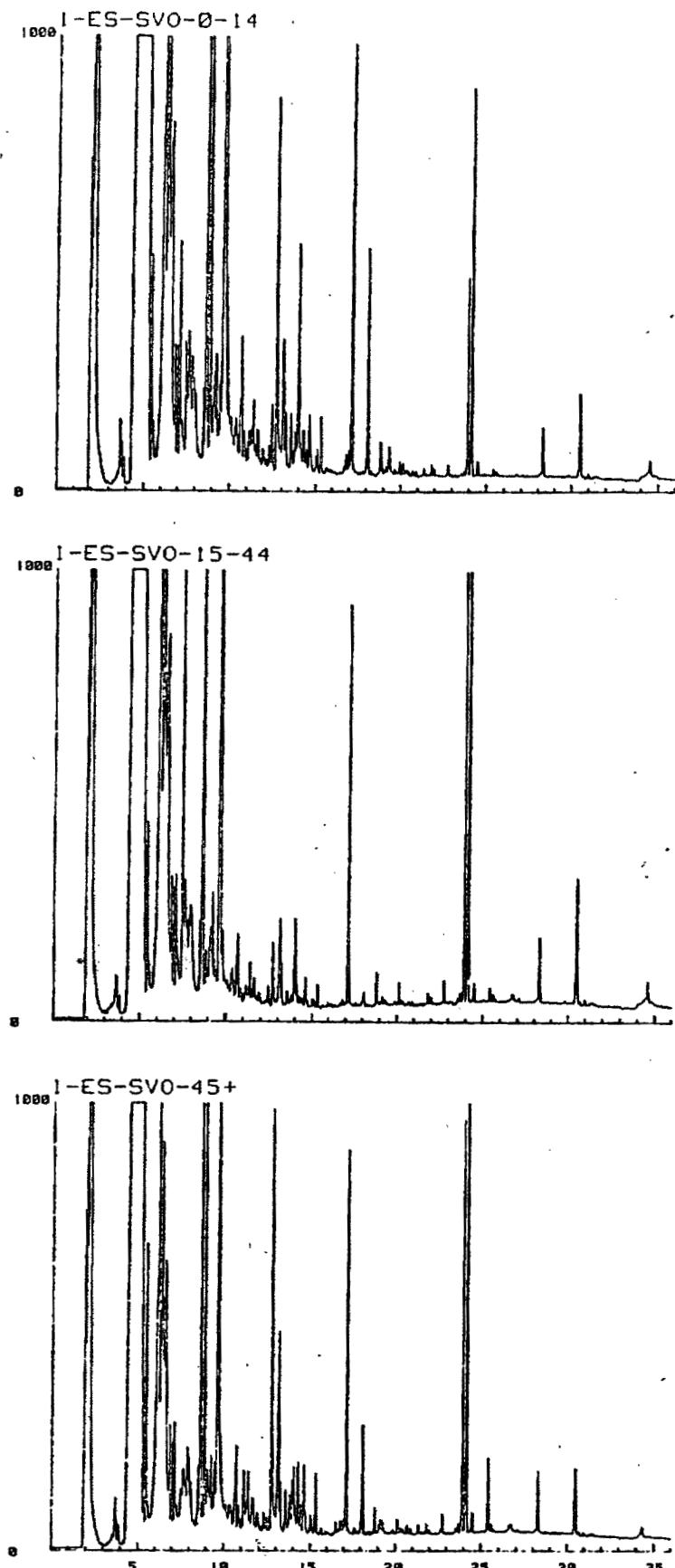


Figure 20. HRGC/ECD chromatogram from the analysis of the 15/50% diethyl ether Florisil fraction of the three age group composites from the East South Central (ES) census division.

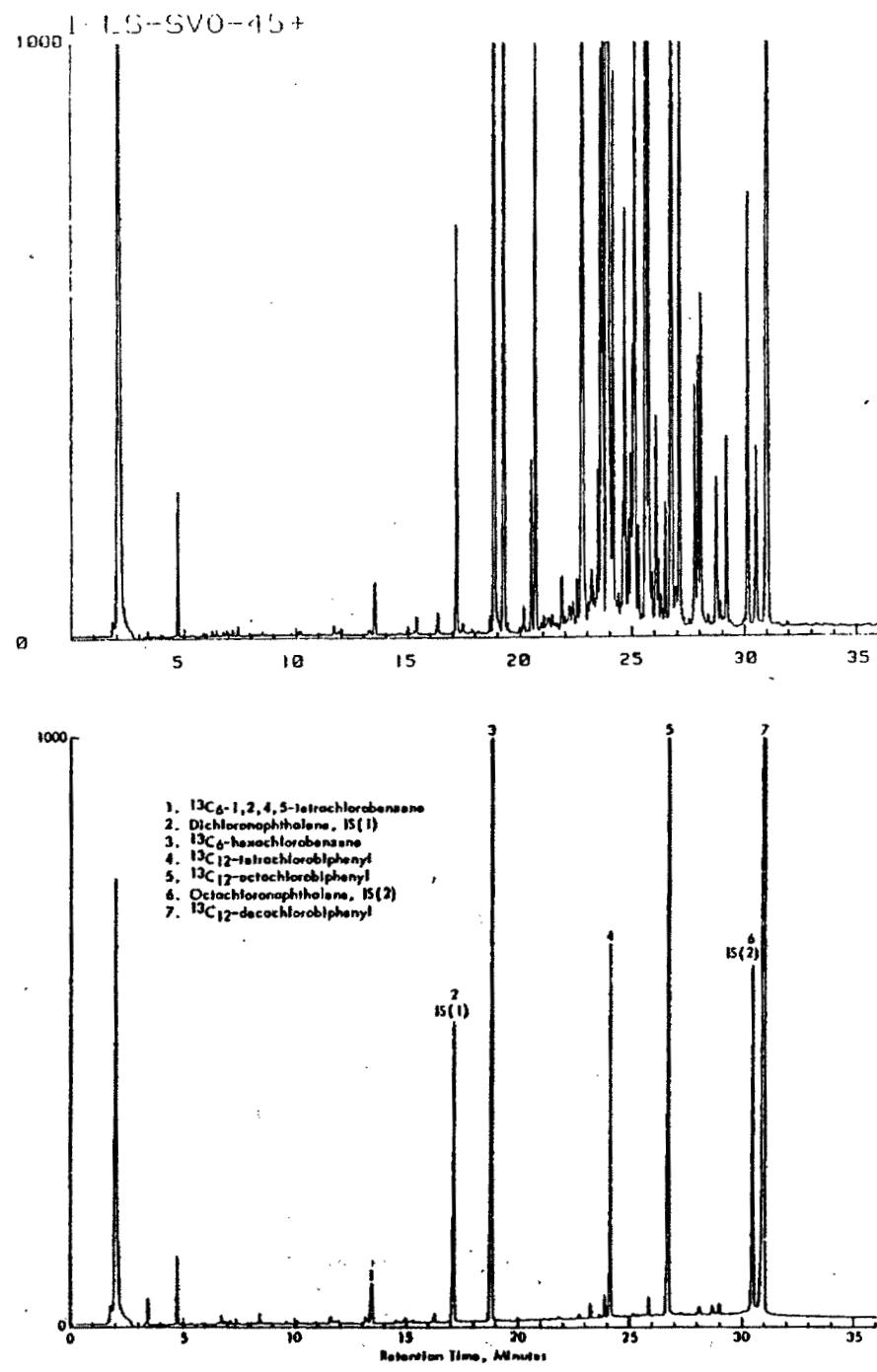


Figure 21. Comparison of the HRGC/ECD chromatograms of the 6% Florisil fraction of the 45-plus age category of the ES census division and the elution of the surrogates and internal standards.

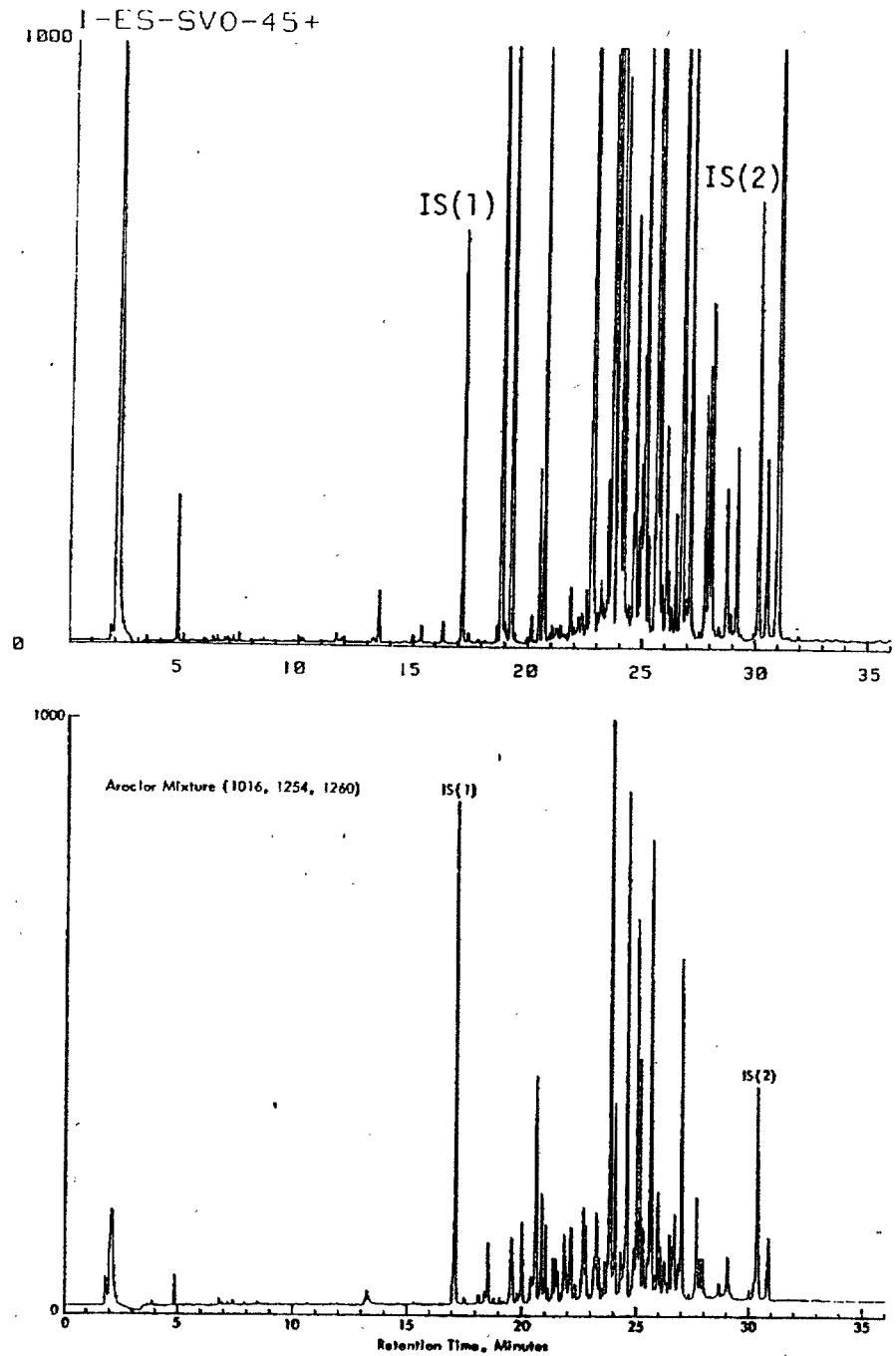


Figure 22. Comparison of the HRGC/ECD chromatograms of the 6% Florisil fraction of the 45-plus age category of the ES census division and the elution of PCBs as a mixture of Aroclors (1016, 1254, 1260).

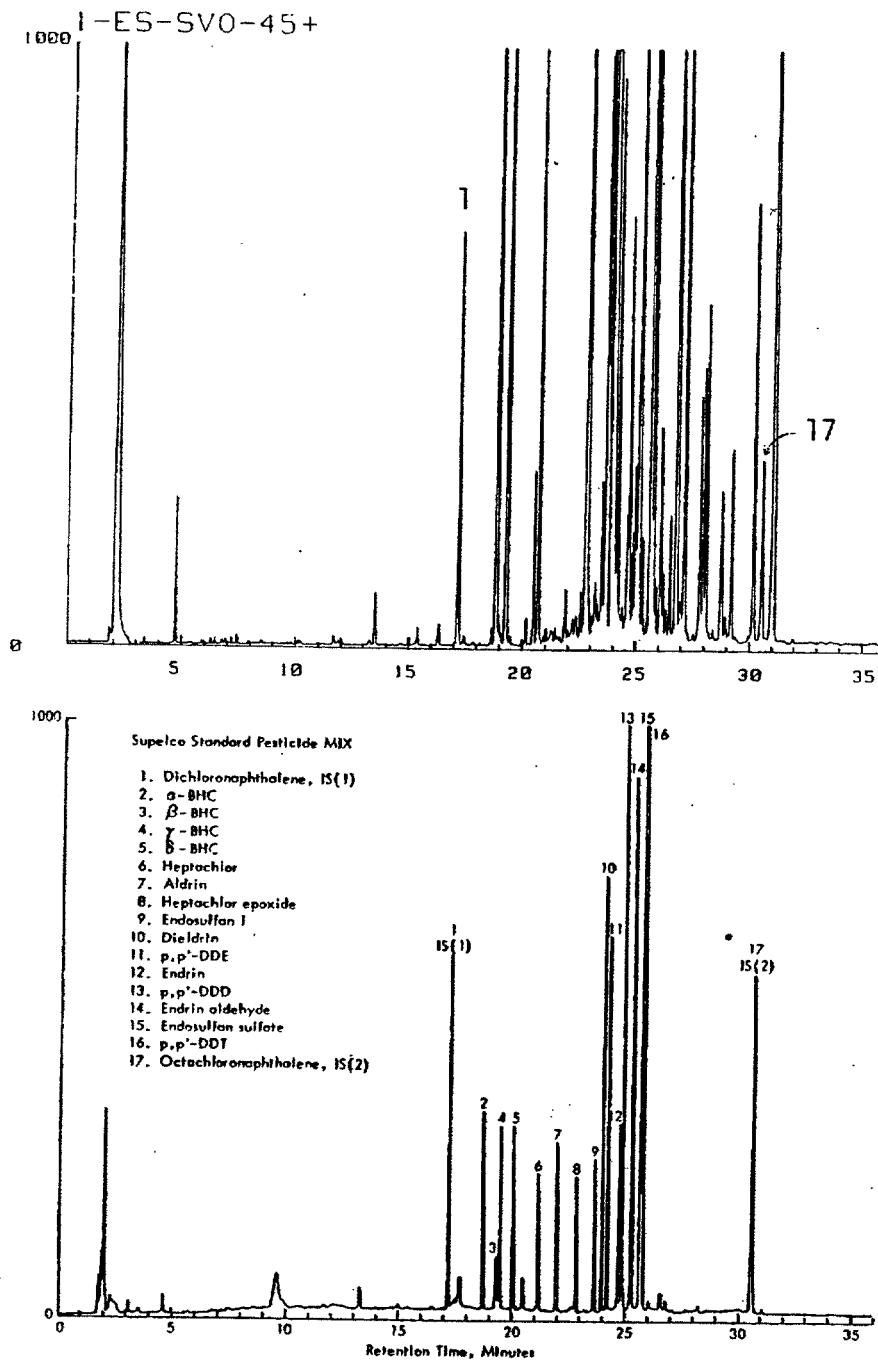


Figure 23. Comparison of the HRGC/ECD chromatograms of the 6% Florisil fraction of the 45-plus age category of the ES census division and the elution of a commercial mixture (Supelco) of pesticides.

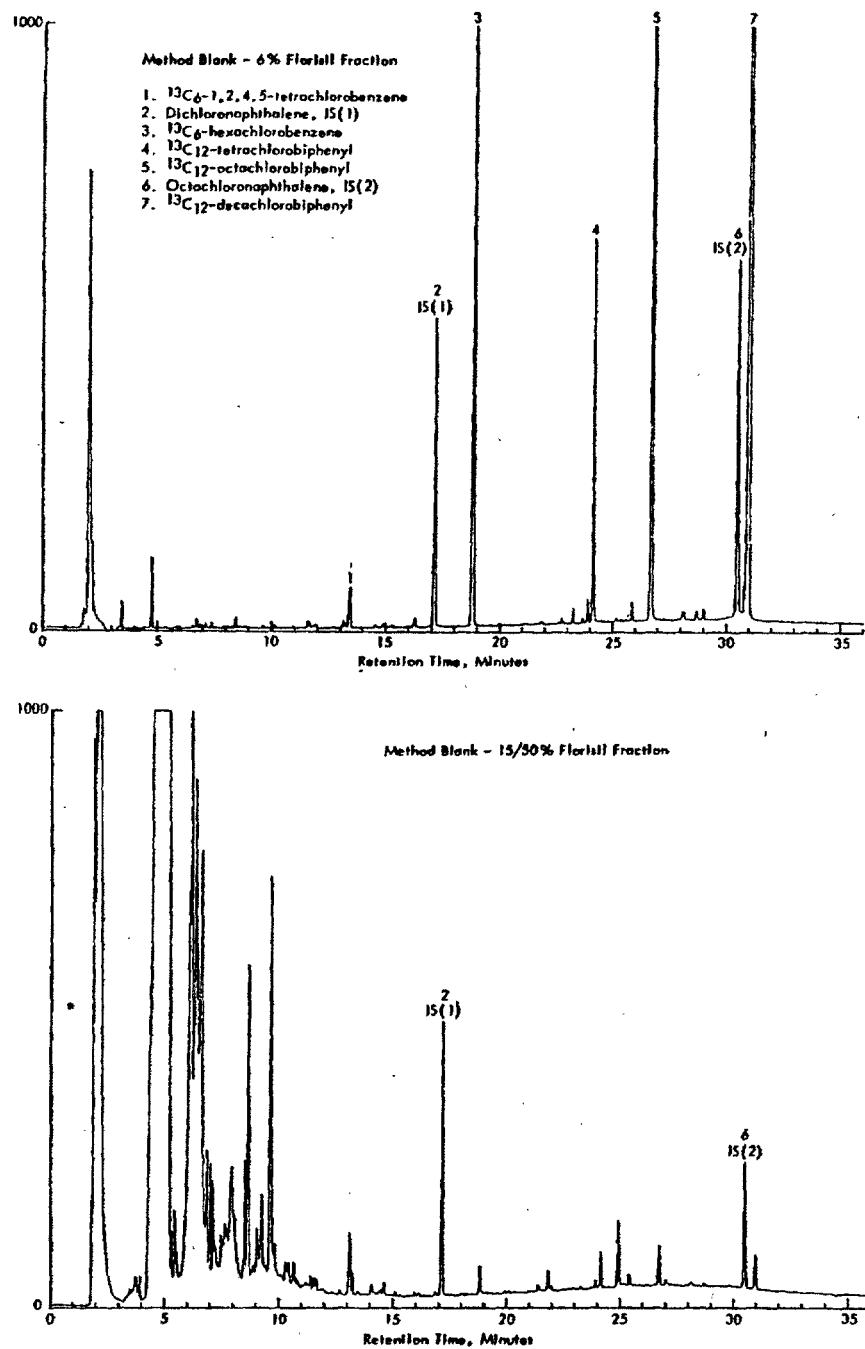


Figure 24. HRGC/ECD chromatograms of method blanks from 6% and 15/50% Florisil fractionation.

B. Toxaphene Analysis

The sample extracts from the 45+ age category that were taken through additional cleanup and fractionation procedures for toxaphene determination were analyzed by both HRGC/ECD and HRGC/MS in the SIM mode. The methylene chloride/cyclohexane fraction from the carbon/glass fiber column contained the organochlorine pesticides, PCBs, and the toxaphene components. This required further fractionation on Florisil as described in the experimental section. Although this procedure was demonstrated to be effective for the separation of PCBs from toxaphene, the HRGC/ECD analysis of the sample extract demonstrated considerable response to compounds other than the toxaphene mixture.

Since toxaphene is a multicomponent mixture of polychlorinated compounds, it was determined that HRGC/MS-SIM techniques were necessary to determine the presence of this pesticide in the composited adipose tissue extracts.

The HRGC/MS chromatogram in Figure 25 is presented as an example of the complexity of the toxaphene mixture. Estimates of the number of components within technical toxaphene range from 177 to 670 compounds resulting from hexachloro- through nonachloroboranes and borenes. Figures 26 and 27 are examples of the mass spectra of two chromatographic peaks achieved by electron impact ionization. Due to the extensive fragmentation of these polychlorinated compounds, the HRGC/MS-SIM technique was necessary to determine if toxaphene was present in the sample extract.

Figure 28 presents plots of some of the characteristic ions from the toxaphene mixture. Although significant response is noted for ions at masses as high as 377 amu, the literature indicates that these components are degraded extensively in environmental samples (Ribick, Dubay, Petty, Stalling, Schmitt 1982; Jansson, Wideqvist 1983). Therefore, ions selected for HRGC/MS analysis were selected in the range of 231 to 345 amu. The extracts were first analyzed using ions at 231, 233, 235, 269, 271, 273, 305, 307, and 309 amu. Several of the extracts were selected for additional analyses using ions at 305, 307, 309, 327, 329, 331, 341, 343, and 345 (amu).

The results of these analyses indicated that some interferences still persisted even after the extensive cleanup procedures. In particular, significant responses were noted at the lower mass ranges possibly resulting from the presence of chlordane related components. These interferences were also noted in the HRGC/ECD screening of these sample extracts.

The ion profile responses for the sample extracts indicated that the toxaphene pattern is significantly degraded from the toxaphene standard used to establish the HRGC/MS-SIM monitoring parameters. Degradation of the toxaphene pattern in environmental sample analysis has been noted in other studies (Ribick, Dubay, Petty, Stalling, Schmitt 1982; Jansson, Wideqvist 1983). Quantitation of the data is not possible due to these drastic differences in the sample extracts and the standard. However, the low level toxaphene standard that was analyzed was equivalent to approximately 0.10 µg/g in the tissue extracts. Based on the responses observed in the selected composite specimens the residue levels of toxaphenes in the composite tissues were less than the 0.10 µg/g level.

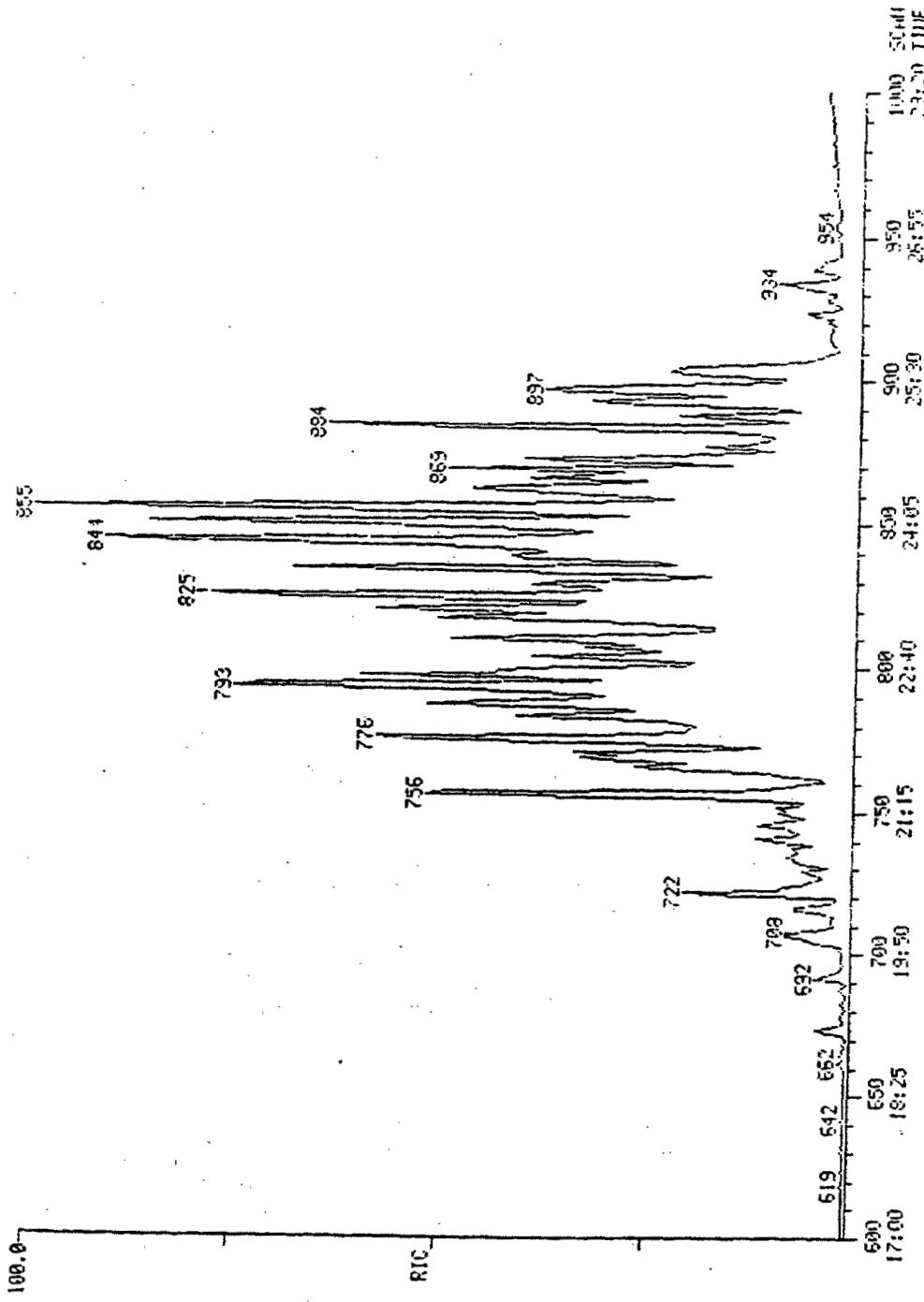
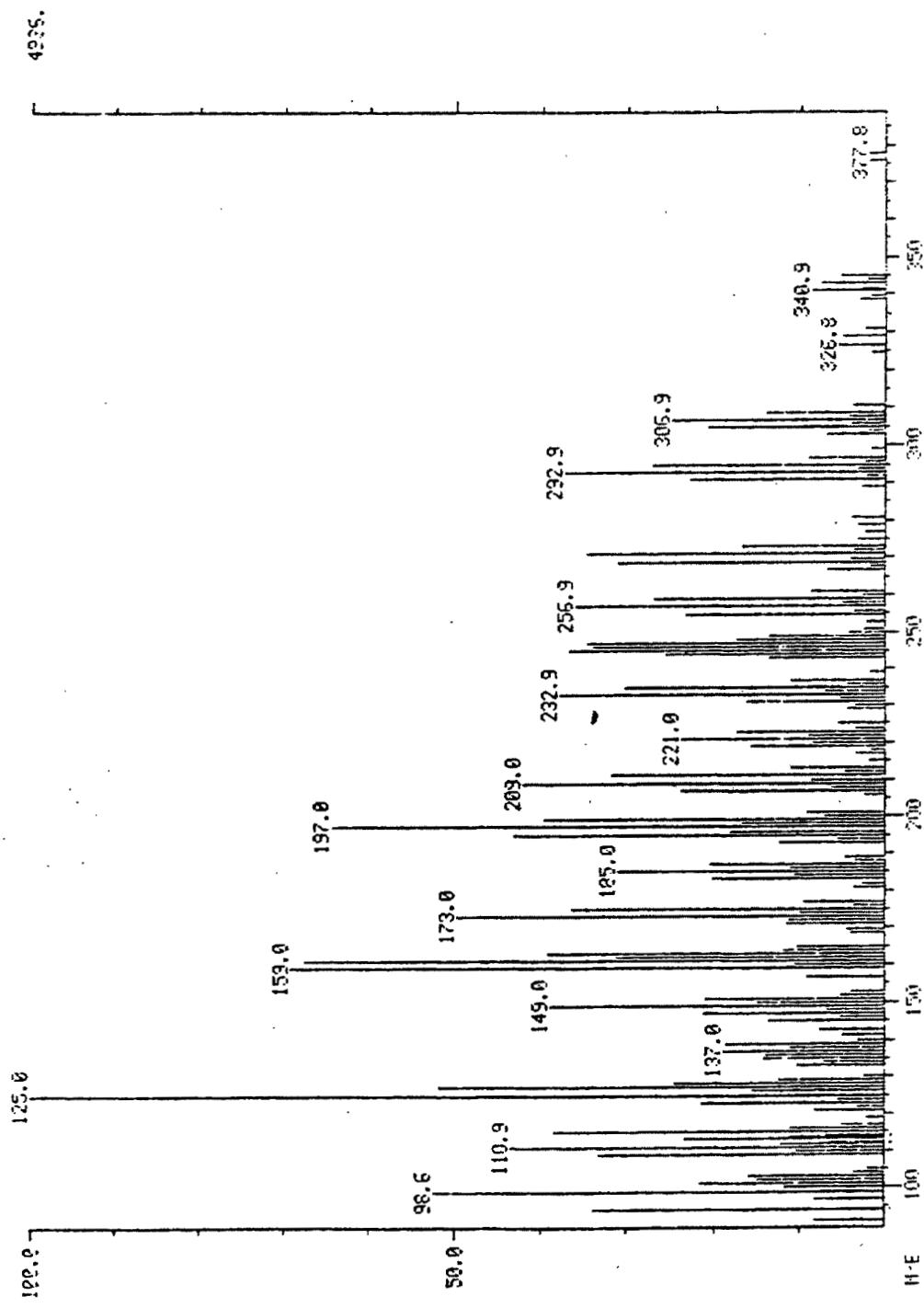


Figure 25. Total ion chromatogram for the HRGC/MS full scan analysis of a 0.90 $\mu\text{g}/\mu\text{L}$ standard of toxaphene using a 30-m DB-5 fused silica column temperature programmed from 60°C (2-min hold) to 340°C at 10°C/min.



115

128

Figure 26. Mass spectrum for scan no. 756 from the total ion chromatogram from Figure 25 (toxaphene standard).

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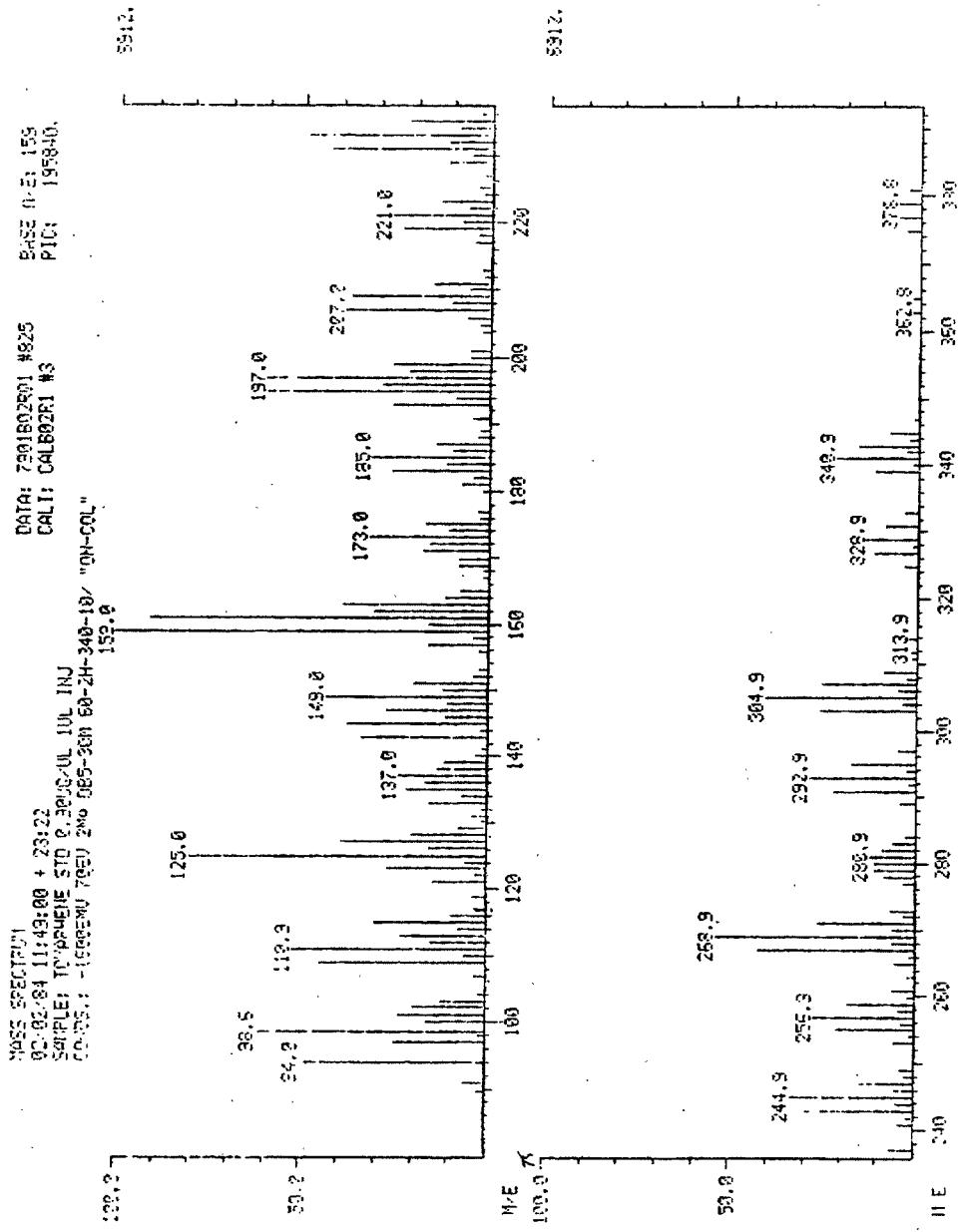


Figure 27. Mass spectrum for scan no. 825 from the total ion chromatogram from Figure 25 (toxaphene standard).

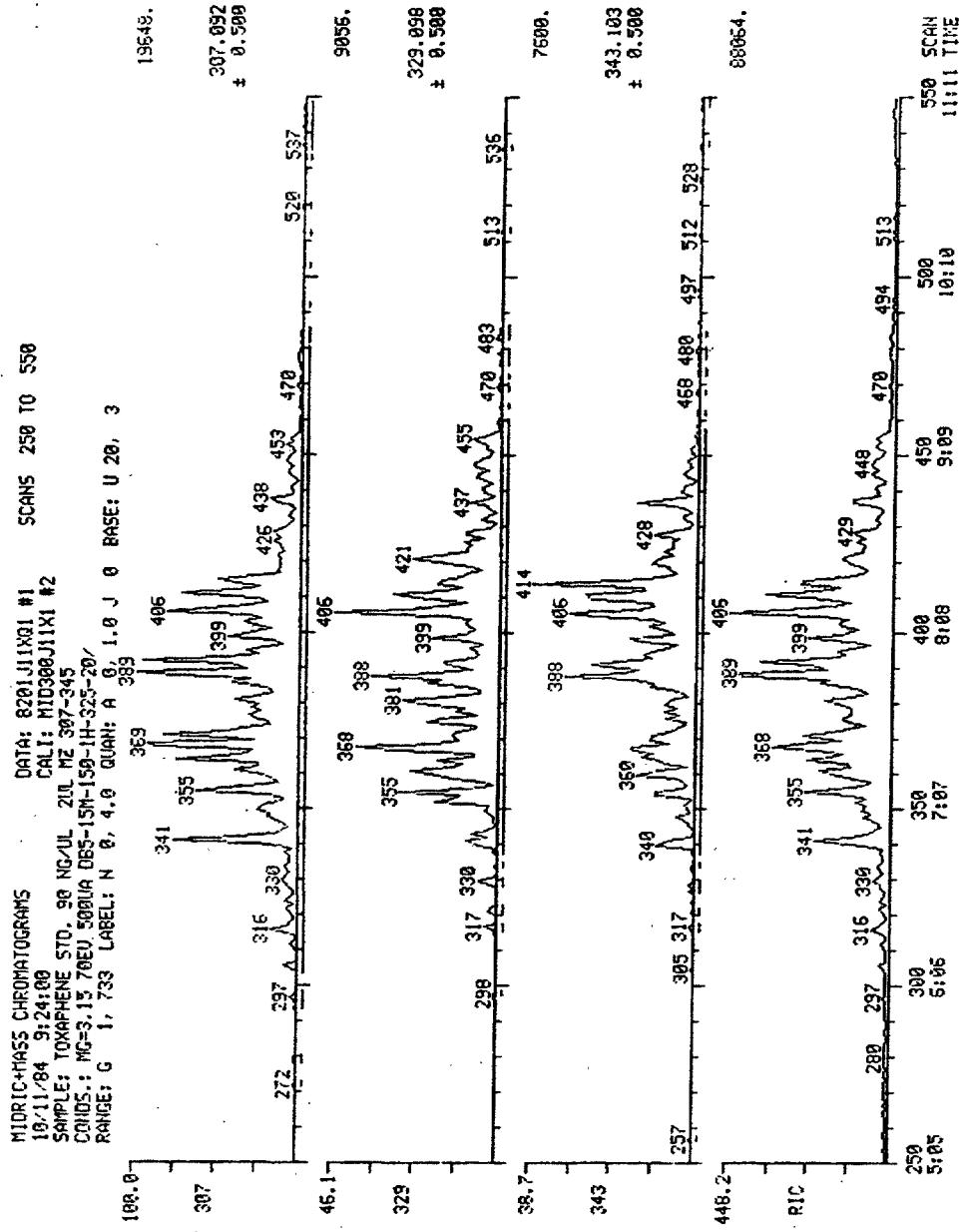


Figure 28. Selected ion current plots of characteristic fragment ions for toxaphene from an HRGC/MS-SIM analysis.

Table 36 presents a qualitative summary of the identification of toxaphene in the composite adipose tissues representing the 45+ age category. As noted in the table, 12 of the 14 sample extracts exhibited responses characteristic to the toxaphene standard. Although these results suggest the presence of toxaphene, it is recommended that further analysis be conducted using an alternate MS technique, such as negative chemical ionization mass spectrometry (NCI-MS) to provide additional confirmation. The advantage of NCI-MS is the generation of less complex mass spectra which contain prominent, characteristic ions that can be used to establish confirmation and can be used for quantitative efforts.

V. QUALITY ASSURANCE/QUALITY CONTROL

As discussed in the experimental section, the QA/QC program included analysis of spiked lipid samples, spiked blanks, replicate analysis of homogenized lipid samples, analysis of a reference material prepared by EPA/EMSL-LV (porcine fat), and analysis of method blanks. Other QA/QC facets included documentation of the absolute recovery of the surrogate compounds and the response of the internal standard (anthracene-d₁₀) for each sample analyzed. Also, the identification of a compound via the automated quantitation routine was verified by retrieving and verifying the full scan mass spectra for each identification versus the NBS mass spectral reference library.

A. Spiked Tissue Samples

A bulk lipid sample was prepared by homogenizing and extracting human adipose tissue. The homogenized sample was filtered through anhydrous sodium sulfate to remove water and particulate matter. The resulting extract was taken through the GPC cleanup procedure, and the lipid was recovered from the discard fraction of the procedure. This process provided a homogeneous matrix relatively free of contamination from the target analytes. The homogenized lipid matrix was spiked with known levels of the target analytes and taken through the entire cleanup procedures (GPC/Florisil) along with actual samples. Table 37 provides a summary of the analysis of five spiked matrix samples (10% of all composite samples analyzed). As noted from the table, recoveries of the various compounds ranged from an average of 22% (tris(1,3-dichloropropyl)phosphate/tri-m-tolylphosphate) to 204% for p,p-DDE. The high recovery of p,p-DDE may be a result of incomplete separation from the original lipid matrix. An unspiked sample of this material was not analyzed to confirm the background contribution. Precision of the five replicate analyses ranged from 11% for the p,p-DDE to 74% for the 2,4,5-trichloro-o-terphenyl.

B. Spiked Blanks

Table 38 summarizes the recovery data for target analytes spiked into aliquots of solvent that were taken through the GPC/Florisil cleanup procedures and analyzed under the same HRGC/MS conditions as required for the composite sample analysis. A comparison of the recoveries of the analytes from the spiked lipid samples and the spiked blanks is provided in Table 39. The method recoveries from the spiked blanks are greater than determined from the spiked lipid samples. As expected, these differences may be attributed to the effect of the sample matrix on method recovery.

Table 36. Qualitative Summary of Toxaphene Identification
in 45+ Age Category

Sample no.	Presence of toxaphene ^a
1-WN-45+	+
2-WN-45+	+
1-SA-45+	++ ^b
3-SA-45+	++ ^b
4-SA-45+	+
1-ES-45+	+
2-ES-45+	+
1-WS-45+	+
1-MO-45+	+
1-MA-45+	-
2-MA-45+	+
1-PA-45+	-
2-EN-45+	+
3-EN-45+	++ ^b

^aIons monitored for HRGC/MS analysis included m/z 231, 233, 235, 269, 271, 273, 305, 307, and 309.

^bAdditional ions monitored for HRGC/MS characterization included m/z 305, 307, 309, 327, 329, 331, 341, 343, and 345.

Table 37. Recovery Efficiency of Semivolatile Organics from Spiked Human Adipose Tissues^a

Compound	MRI sample number					Average Recovery	Standard Deviation
	QC 223	QC 229	QC 234	QC 239	QC 240		
1,2-Dichlorobenzene	51	54	39	ND ^b	ND	48	8
2,4-Dichlorophenol	48	ND	82	63	103	74	24
1,2,4-Trichlorobenzene	56	40	57	ND	ND	51	10
Naphthalene	127	140	97	ND	ND	120	22
2,4,6-Trichlorophenol	30	ND	41	30	45	37	8
Acenaphthylene	62	55	40	32	33	44	13
Dimethyl phthalate	39	88	53	48	54	56	19
Acenaphthene	67	53	40	34	32	46	16
Pentachlorobenzene	54	42	30	25	21	34	14
Fluorene	71	54	44	41	35	50	15
Diethyl phthalate	55	87	59	58	59	65	13
4-Chlorodiphenyl ether	61	50	38	31	26	41	14
4-Bromobiphenyl	68	61	47	45	37	52	13
α -BHC	103	100	83	66	62	83	19
Hexachlorobenzene	67	45	47	44	39	49	12
β -BHC	97	ND	62	56	50	66	21
Phenanthrene	83	75	65	61	60	70	11
Δ -BHC	58	53	74	61	66	62	8
Heptachlor	71	77	93	58	66	73	13
Di-n-butyl phthalate	110	126	55	46	86	85	34
Aldrin	80	87	71	67	66	74	9
4,4'-Dibromobiphenyl	96	115	98	76	89	95	14
2,4,6-Tribromobiphenyl	70	79	70	55	58	66	10
Heptachlor epoxide	67	111	106	79	91	91	18
Fluoranthene	81	97	93	64	73	79	14
σ -p'-DDE	65	63	61	42	50	56	10
Pyrene	68	96	94	58	69	78	16
Chrysene	66	70	67	45	55	61	10
γ -Chlordane	65	83	78	59	67	71	10
trans-Nonachlor	78	6 ^c	90 ^d	60 ^d	77 ^d	76 ^d	12
p-p'-DDE	214 ^d	220 ^d	217 ^d	165 ^d	203 ^d	204 ^d	23
Dieldrin	136	75	41	42	ND	74	45
σ -p'-DDD	63	77	69	42	56	61	13
p-p'-DDD	69	136	116	66	79	93	31
2,2',4,4',5-Pentachlorodiphenyl ether	58	102	85	51	69	73	21
σ -p'-DDT	54	136	116	66	79	90	35
tris(1-dichloropropyl) phosphate	37	31	15	17	12	22	11
Butyl benzyl phthalate	74	55	27	26	22	41	23
2,2',4',5-Tetrabromobiphenyl	64	128	116	58	68	87	33
p-p'-DDT	63	126	126	43	62	84	39
Triphenyl phosphate	51	40	21	17	17	29	15
4-Chloro-p-terphenyl	33	70	57	27	38	49	25
2,5-Dichloro-p-terphenyl	45	91	77	32	45	58	25
Di-n-octyl phthalate	143	55	46	29	43	63	46
Mirex	48	102	68	31	42	58	28
Tri-m-tolyl phosphate	ND	32	23	15	18	22	7
2,4",5-Trichloro-p-terphenyl	35	143	115	26	43	72	53
2,4,4',6-Tetrachloro-p-terphenyl	48	160	119	32	39	80	57
d ₈ -Naphthalene	59	54	38	18	26	39	17
¹³ C ₆ -1,2,4,5-Tetrachlorobenzene	57	52	40	21	24	39	16
¹³ C ₆ -Hexachlorobenzene	65	47	46	43	39	48	9
d ₁₂ -Chrysene	40	51	47	21	24	37	11

^aA bulk lipid sample was spiked with the following compounds at concentrations equivalent to 0.1 μ g/g. The samples were taken through GPC and Florisil fractionation prior to HRGC/MS analysis.

^bNot determined. Not included in the average recovery calculation.

^cNot included in average.

^dHigh recovery due to contribution from the adipose tissue matrix.

Table 38. Method Evaluation Experiments Percent Recovery (Spiked Solvent Blanks)

Compound	203	204	MRI sample number	218	219	221	Average % recovery	Standard deviation	% Relative standard deviation
Chlorobenzene	9	ND ^a	ND	40	29	27	26	13	49
1,2-Dichlorobenzene	26	62	63	82	74	51	60	20	33
2,4-Dichloropheno1	40	57	77	73	63	60	62	13	20
1,2,4-Trichlorobenzene	37	59	67	80	65	57	61	14	23
Naphthalene	39	137	75	73	61	57	74	34	46
2,4,6-Trichloropheno1	41	58	85	74	65	65	65	15	23
Acenaphthylene	48	55	75	76	66	68	65	11	17
Dimethyl phthalate	33	51	63	68	58	56	55	12	22
Acenaphththene	55	66	74	74	61	62	65	8	12
Pentachlorobenzene	56	50	71	77	51	63	61	11	18
¹³ C-Monochlorobiphenyl	57	37	75	98	87	67	70	22	31
Fluorene	58	50	71	78	69	65	65	10	15
Diethyl phthalate	40	52	48	58	44	52	49	6	13
4-Chlorodiphenyl ether	56	53	72	78	67	67	66	9	14
4-Bromobiphenyl	70	63	71	105	87	79	79	15	19
α -BHC	61	82	73	99	79	75	78	12	16
Heptachlorobenzene	68	66	30	105	89	78	73	25	35
Tri(2-chloroethyl) phosphate	33	54	44	41	97	9 ^b	54	25	47
β -BHC	83	126	85	123	101	17 ^b	104	20	20
Phenanthrene	90	73	75	90	80	81	82	7	9
Δ -BHC	76	79	85	115	83	80	86	14	19
Heptachlor	87	85	79	131	69	139	98	29	30
Di-n-butyl phthalate	79	104	51	38	22	49	57	30	52
Pentachloropheno1	110	76	76	78	60	79	80	16	20
Aldrin	87	72	68	90	63	85	78	11	15
4,4'-Dibromobiphenyl	110	88	84	122	84	90	96	16	16
2,4,6-Tribromobiphenyl	110	92	84	129	87	96	100	17	17
Heptachlor epoxide	112	ND	102	64	78	89	89	22	25
Fluoranthene	138	123	98	106	66	91	104	25	24
α , β -DDT	117	88	85	116	68	88	94	19	20
Pyrene	145	84	101	108	68	95	100	26	26
Chrysene	125	90	96	114	72	82 ^b	97	20	21
trans-Nonachlor	103	ND	72	52	115	9 ^b	86	29	34
β , β -DDT	152	86	96	124	70	93	104	30	29
Die drin	126	72	76	111	59	93	90	25	28
¹³ C ₁₂ -Tetrachlorobiphenyl	121	67	103	145	81	93 ^b	102	28	28
α , β -DDD	125	101	105	138	77	18 ^b	109	23	21
α , β -DDO	175	97	122	124	70	111	117	35	30
2,2',4,4',5-Pentachlorobiphenyl	157	92	101	129	71	97	108	30	28
α , β -DDT	136	85	98	121	80	90	102	22	22
Tris(1,3- or 2,3-dichloropropyl) phosphate	20	35	26	28	ND	34	29	6	21
Butyl benzyl phthalate	39	67	48	60	41	54	52	11	21
2,2',4,5-Tetrabromobiphenyl	133	107	117	156	94	115	120	22	18
α , β -DDT	131	99	116	131	105	110	110	19	17

Table 38 (continued)

Compound	MRI sample number					Average % recovery	Standard deviation	% Relative standard deviation
	203	204	206	218	219			
Triphenyl phosphate	67	51	79	82	99	89	78	17
4-Chloro-p-terphenyl	121	80	126	146	86	118	113	22
2,5-Dichloro-o-terphenyl	107	93	99	148	106	127	113	22
1,2-Benzanthracene	99	81	133	170	112	126	120	18
2,5-Dichloro-m-terphenyl	112	80	121	162	102	97	112	26
Di-n-octyl phthalate	23	64	58	41	36	31	16	25
2,2',4,5',6-Pentabromobiphenyl	14	ND	128	189	91	ND	106	39
Mirex	110	ND	ND	150	95	111	116	69
Tri-m-tolyl phosphate	117	ND	31	50	ND	72	42	24
2,4",5-Trichloro-g-terphenyl	77	85	126	164	160	173	131	57
2,4,4",6-Tetrachloro-g-terphenyl	73	95	124	184	149	174	133	32
1,2,5,6-Dibenzanthracene	23	71	ND	ND	29	194	98	44
Benzof[<i>g,h,i</i>]perylene	18	84	ND	ND	210	176	157	88
<i>Y</i> -Chlordane	122	c	ND	96	72	87	94	41
d ₈ -Naphthalene	38	c	71	92	80	63	69	22
13C-1,2,4,5-Tetrachlorobenzene	44	c	70	80	67	56	63	30
13C-Pentachlorophenoxy	72	c	84	91	123	96	93	22
13C-Hexachlorobenzene	69	c	32	102	88	79	74	20
d ₁₂ -Chrysene	102	c	130	171	112	122	127	36
2-Chlorobiphenyl	52	c	75	81	84	68	72	21
4-Chlorobiphenyl	57	c	74	95	84	74	77	18
2,4-Dichlorobiphenyl	75	c	71	85	80	80	78	18
2,4,6-Trichlorobiphenyl	73	c	73	108	91	88	87	6
2,2',4,6-Tetrachlorobiphenyl	83	c	76	101	85	86	86	17
2,2',3,4,5-Pentachlorobiphenyl	123	c	98	130	71	93	103	10
2,2',3,5,5'-Hexachlorobiphenyl	120	c	95	138	82	95	106	23
2,2',3,4,4',5,6-Heptachlorobiphenyl	109	c	107	154	95	126	118	22
2,2,3,3',4,4',5,6-Octachlorobiphenyl	86	c	117	147	126	22	119	19
2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	85	c	122	62	111	18	80	21
Decachlorobiphenyl	65	c	89	21	150	43	74	52
								68

^aND - Not determined.^bNot indicated in calculation of the average recovery.
CNot included in spike.

Table 39. Comparison of the Average Recovery Efficiency of Semivolatile Organics from Spiked Lipid Samples and Spiked Blanks

Compound	Lipid samples (n = 5)		Blanks (n = 6)	
	Average recovery	RSD (%)	recovery	RSD (%)
1,2-Dichlorobenzene	48	17	60	33
2,4-Dichlorophenol	74	32	62	20
1,2,4-Trichlorobenzene	51	20	61	14
Naphthalene	120	18	74	46
2,4,6-Trichlorophenol	37	22	65	23
Acenaphthylene	44	30	65	17
Dimethyl phthalate	56	34	55	22
Acenaphthene	46	34	65	12
Pentachlorobenzene	34	30	61	18
Fluorene	50	20	65	15
Diethyl phthalate	65	34	49	13
4-Chlorodiphenyl ether	41	25	66	14
4-Bromobiphenyl	52	23	79	19
α -BHC	83	25	78	16
Hexachlorobenzene	49	24	73	35
β -BHC	66	32	104	20
Phenanthrene	70	16	82	8
Δ -BHC	62	13	86	19
Heptachlor	73	18	98	30
Di-n-butyl phthalate	85	40	57	52
Aldrin	74	12	78	15
4,4'-Dibromobiphenyl	95	15	96	16
2,4,6-Tribromobiphenyl	66	15	100	17
Heptachlor epoxide	91	20	89	25
Fluoranthene	79	18	104	24
o,p' -DDE	56	18	94	20
Pyrene	78	21	100	26
Chrysene	61	16	97	21
γ -Chlordane	71	14	94	22
trans-Nonachlor	76	16	86	34
p,p' -DDE	204	11	104	29
Dieldrin	74	61	90	28
o,p' -DDD	61	21	109	21
p,p' -DDD	93	33	117	30
2,2',4,4',5-Pentachlorodiphenyl ether	73	29	108	28
o,p' -DDT	90	39	102	22
tris(1,3-Dichloropropyl) phosphate	22	50	29	21
Butyl benzyl phthalate	41	56	52	21
2,2',4',5-Tetrabromobiphenyl	87	38	120	18
p,p' -DDT	84	41	110	17
Triphenyl phosphate	29	52	78	17

Table 39 (continued)

Compound	Lipid samples (n = 5)		Blanks (n = 6)	
	Average recovery	RSD (%)	recovery	RSD (%)
4-Chloro-p-terphenyl	49	51	113	22
2,5-Dichloro-o-terphenyl	58	43	113	21
Di-n-octyl phthalate	63	73	41	39
Mirex	58	48	116	21
Tri-m-tolyl phosphate	22	32	42	24
2,4,5-Trichloro-o-terphenyl	72	74	131	32
2,4,4',6-Tetrachloro-o-terphenyl	80	71	133	33
d ₈ -Naphthalene	39	44	69	30
¹³ C ₆ -1,2,4,5-Tetrachlorobenzene	39	41	63	22
¹³ C ₆ -Hexachlorobenzene	48	19	74	36
d ₁₂ -Chrysene	37	30	127	21

C. Porcine Fat

A porcine fat sample (Adipose 121) provided by EPA-EMSL/LV was analyzed periodically as another means of determining the accuracy of the method for selected organochlorine pesticides. A primary difference in the porcine fat sample and the human adipose tissue samples was noted in the difference of the GPC profiles. The lipid peak from the porcine fat eluted from the GPC column at an earlier retention time and as a well defined Gaussian peak shape as compared to human adipose tissues. Typically, the lipid peak from the human adipose tissue was noted to tail into the collection cycle of the GPC cleanup.

Table 40 summarizes the results from the analysis of five aliquots of the reference material over the course of the analysis of the adipose tissue samples. Table 40 also reports the actual concentrations of porcine fat as reported by EPA-EMSL/LV and the accuracy of each of the measurements. Positive identification and quantitation of each of the spiked analytes was not possible due to the limitation encountered for the analysis of 1.0 g sample aliquots. Trace levels of *trans*-nonachlor and *p,p'*-DDT were detected in the sample extracts. The *p,p'*-DDE residue was detected in all five of the analyses with an accuracy ranging from 76 to 210%. The levels of *p,p'*-DDE were detected as positive quantifiable values. Responses to characteristic ions from the molecular clusters for hexachlorobenzene, β -BHC, heptachlor epoxide, mirex, and oxychlordane were observed. However, the intensities of the responses were less than the 2.5 times signal-to-noise as required for establishing the detection limit.

D. Replicate Analyses

Replicate sample analyses were completed using a bulk homogenized lipid sample extracted from composited adipose tissue samples. The replicate analyses were achieved using either 1- or 4-g aliquots of the homogenized lipid. The HRGC/MS analysis resulted in the detection of several organochlorine pesticides, PCBs, phthalate esters, and PAHs. The results of the replicate analysis are presented in Table 41. The compounds that were detected consistently in the 4-g samples included hexachlorobenzene, β -BHC, heptachlor epoxide, *trans*-nonachlor, *p,p'*-DDE, *p,p'*-DDT, diethyl phthalate, and di-n-octyl phthalate.

The results for *p,p'*-DDE provide the most consistent data. The data point for sample QC-235 is considered an outlier by using a simple Q-test. The reported concentration for the remaining 15 samples range from 1,600 to 3,000 ng/g with an average of 2,260 ng/g and precision of 20%. Since *p,p'*-DDE is the analyte present at the highest concentration, it is expected that it would provide the best measure of method precision. The variability in the concentration of other analytes is in part due to the small sample sizes (1 to 4 g) in comparison to the 20-g composite adipose samples. Responses for the characteristic ions for hexachlorobenzene, naphthalene, phenanthrene, and penta- through heptachloro-PCBs were observed in each of the replicate tissue samples. However, the responses for these components were below the estimated limit of detection and thus were considered as not detected in these analyses. Further studies based on this broad scan analysis approach should require the use of replicate samples of equivalent size to the composite samples.

Table 40. Data Summary for the HRGC/MS Analysis of an EML/LV QA/QC Spiked Porcine Adipose Sample (Adipose 121)

Compound	Spiked concentration (ng/g) ^a	Concentration (ng/g)			
		QC-205 1 g 4/13/84	QC-212 1 g 4/14/84	QC-216 1 g 5/3/84	QC-217 1 g 4/19/84
Hexachlorobenzene	60	ND (200)	ND (200)	ND (200)	ND (200)
β -BHC	99	ND (200)	ND (200)	ND (200)	ND (200)
Heptachlor epoxide	80	ND (200)	ND (200)	ND (200)	ND (200)
trans-Nonachlor	180	200 (110)	ND (200)	ND (200)	220 (120)
Σ , Σ' -DDE	2,100	1,650 (79)	1,900 (90)	1,700 (81)	4,300 (210)
Σ , Σ' -DDT	320	330 (103)	ND (200)	350 (110)	713 (220)
Mirex	100	ND (200)	ND (200)	ND (200)	240 (240)
Oxychlordane	140	ND (200) ^c	ND (200)	ND (200)	ND (200)
Dieldrin	200	ND (200)	ND (200)	ND (200)	ND (200)

^aData provided by EPA/EML/LV in February 9, 1984, communication to laboratories participating in the pesticide intercomparison study.
 bValue in parenthesis is reported with not detected (ND) is the estimated limit of detection. The value in parenthesis for a compound that was detected indicates the percent accuracy with respect to the actual concentration.
^cEstimated detection limit in ng/g.

Table 41. Data Summary for the Broad Scan Analysis of a Homogenized Bulk Lipid (Human Adipose) Sample

MRI QC Sample No.: Sample Wt.:	QC-207 4 g	QC-208 4 g	QC-209 4 g	Concentration (ng/g)				QC-230 1 g	QC-231 4 g
				QC-210 4 g	QC-211 4 g	QC-225 1 g	QC-230 1 g		
Compound									
β -BHC	180	190	170	63	130	ND (200)	ND (200)	ND (200)	80
Heptachlor epoxide	59	74	590	ND (50)	ND (50)	ND (200)	ND (200)	ND (200)	ND (50)
<u>trans</u> -Nonachlor	350	300	970	230	390	ND (200)	ND (200)	ND (200)	190
D,D'-DDE	2600	2100	1300	2200	2900	3000	2400	2400	1900
D,D'-DDT	100	93	94	210	74	ND (200)	ND (200)	ND (200)	93
Diethyl phthalate	62	88	ND (50)	52	ND (50)	ND (200)	ND (200)	ND (200)	ND (50)
Di- η -butyl phthalate	130	190	76	140	280	2300	490	490	95
Butylbenzyl phthalate	450	ND (50)	ND (50)	340	100	ND (200)	ND (200)	ND (200)	ND (200)
Di- η -octyl phthalate	200	120	95	1900	400	580	ND (200)	ND (200)	ND (200)

Table 41 (continued)

Compound	Concentration (ng/g)			QC-249		
	QC-241 1 g	QC-243 1 g	QC-247 4 g	QC-248 4 g	QC-249 4 g	QC-249 4 g
β -BHC	240	220	ND (200)	67	91	69
Heptachlor epoxide	ND (200)	ND (200)	ND (200)	ND (50)	ND (50)	ND (50)
<u>trans</u> -Nonachlor	ND (200)	640	ND (200)	260	220	200
P,P' -DDE	2900	6300	2400	1600	2200	1900
P,P' -DDT	ND (200)	450	ND (200)	b	ND (50)	ND (50)
Diethyl phthalate	800	ND (200)	1140	ND (200)	ND (50)	ND (50)
Di-n-butyl phthalate	ND (200)	ND (200)	240	ND (50)	146	120
Butylbenzyl phthalate	ND (200)	ND (200)	ND (200)	ND (50)	58	ND (50)
Di-n-octyl phthalate	1500	320	ND (200)	300	ND (50)	52
						320

^aND - Not detected. Value in parentheses represents the estimated detection limit.
^bCompound detected but data not summarized.

E. Method Blanks

Method blanks were generated as composites during the GPC cleanup of the composited adipose tissue samples. At least one loop of the automated GPC unit was run as a blank for each day's operation. Enough methylene chloride was added to each composite blank to bring the total volume up to the equivalent of a GPC cleanup of a 20-g sample. These composite blanks were taken through Florisil fractionation with the actual samples and analyzed by HRGC/HRMS.

As discussed in the results section of this report, the blanks typically demonstrated background levels of phthalates and phosphate triesters. Blank values for these compounds were noted to fluctuate over a wide range. For example, blank values range from 0.079 to 1.5 µg for diethyl phthalate, 1.2 to 12 µg for di-n-butyl phthalate, and 2.9 to 20 µg for di-n-octyl phthalate. Butyl benzyl phthalate ranged from not detected at 0.2 µg to 0.78 µg. The phthalate data were corrected for a specific blank taken through Florisil with a set of samples. Hence, trends that may occur in these data might be associated with the blank values. If the detection level in a sample was less than the associated blank value, the blank value was reported as the estimated detection limit for that sample.

The phosphate triesters were detected in the method blanks less frequently than phthalate esters. The blank levels for triphenyl phosphate ranged from 2.4 to 26 µg, and the level of tributyl phosphate esters was detected as 7 µg for a single method blank. The values for the phosphate triesters reported are corrected for the observed background concentrations noted in the associated blanks. The criterion for the determination of the detection level of the phosphate triesters was handled as described for the phthalate esters.

F. Surrogate Compound Recovery

The stable isotope labeled surrogate compounds representative of chlorobenzenes, PCBs, and PAHs were spiked into all composite samples, QC samples, and method blanks prior to sample preparation to assess method performance on a per sample basis. The absolute recovery of each of the surrogates was measured versus the internal standard, anthracene-d₁₀, which was added immediately prior to extract analysis by HRGC/MS. The absolute recoveries of the surrogates from the composited samples and the associated QC samples are tabulated in Tables 42 and 43.

As noted in Table 42, the recoveries of ¹³C₆-1,2,4,5-tetrachlorobenzene and ¹³C₁₂-decachlorobiphenyl were determined by both HRGC/MS and HRGC/ECD. The recoveries for the HRGC/ECD analyses were determined from the internal standards, dichloronaphthalene and octachloronaphthalene, which elute within the same retention windows as the two surrogate compounds (Figure 21). The results from the HRGC/ECD determination generally demonstrate higher recoveries than by the HRGC/MS methods, especially the recovery of the ¹³C₁₂-decachlorobiphenyl. The differences in the recoveries from the two methods may be attributed to selection of the internal quantitation standard, matrix effects, or both. The sample extracts analyzed by HRGC/ECD were diluted by a factor of 10 as compared to the extracts analyzed by HRGC/MS.

Table 42. Summary of Surrogate Compound Recoveries (%) from the FY82 Composited Human Adipose Specimens

Sample composite no.	d_8 -Naphthalene	d_{12} -Chrysene	Tetrachlorobenzene	Surrogate compounds			
				$^{13}C_6$ -1,2,4,5-Tetrachlorobenzene	$^{13}C_6$ -Hexachlorobenzene	$^{13}C_6$ -4-Chlorobiphenyl	$^{13}C_{12}$ -3,3',4,4'-Tetrachlorobiphenyl
1-PA-SVO-0-14	41	35	36	51	64	31	25
1-PA-SVO-45+	29	71	31	51	50	67	140 120
1-NE-SVO-0-14	6	16	7	13	16	24	22
1-NE-SVO-15-44	55	23	24	200	83	29	190 12
1-NE-SVO-45+	17	140	24	31	33	92	ND 4
1-MA-SVO-0-14	33	48	52 (59) ^a	67	76	56	37
1-MA-SVO-15-44	23	33	29 (73)	82	74	3	210 (72) 2 (86)
1-MA-SVO-45+	18	27	24	49	64	47	26
1-EN-SVO-0-14	28	40	30 (45)	44	48	40	140 ND
1-EN-SVO-15-44	39	37	44 (68) b (89)	81	87	54	15 (79) 42 (77)
1-EN-SVO-45+	61	b	b (89)	61	86	b	b (62)
1-WN-SVO-0-14	52	68	60 (93)	73	71	71	52
1-WN-SVO-15-44		32	(77)	82	61	90	33 (93) 32 (81)
1-WN-SVO-45+	52	100	68 (85)	74	87	89	72
1-SA-SVO-0-14	57	54	52 (79)	71	73	67	47
1-SA-SVO-15-44	59	96	44 (72)	73	97	86	23 (79) 1 (68)
1-SA-SVO-45+	60	66	59 (80)	85	94	92	2
1-ES-SVO-0-14	43	56	50 (68)	69	65	100	6
1-ES-SVO-15-44	61	68	68 (70)	76	87	120	43 (74) 110
1-ES-SVO-45+	51	57	56 (69)	13	83	110	59 (98) 74
1-WS-SVO-0-14	43	82	54 (61)	58	62	120	88
1-WS-SVO-15-44	68	85	68 (34)	93	94	93	120 (94) 51
1-WS-SVO-45+	34	60	68 (77)	78	91	97	89 (83) 62
1-MO-SVO-0-14	78	180	53 (70)	60	59	170	130
1-MO-SVO-15-44	48	69	40 (35)	40	66	60	52 (72) 25
1-MO-SVO-45+	61	87	75 (34)	84	100	140	63 (76) 140
2-MA-SVO-0-14	23	33	34	40	39	61	27
2-MA-SVO-15-44	29	44	35	47	51	71	110 120
2-MA-SVO-45+	35	74	43	26	56	98	93 71

Table 42 (continued)

Sample composite no.	d ₈ -Naphthalene	d ₁₂ -Chrysene	Tetrachlorobenzene	Surrogate compounds				
				¹³ C ₆ -1,2,4,5-Chlorobiphenyl	¹³ C ₆ -Hexachlorobenzene	¹³ C ₆ -4-Chlorobiphenyl	¹³ C ₁₂ -3,3',4,4'-Tetrachlorobiphenyl	¹³ C ₁₂ -Octachlorobiphenyl
2-EN-SVO-0-14	14	42	28	47	49	46	35	40
2-EN-SVO-15-44	13	14	14	25	20	21	14	57
2-EN-SVO-45+	37	70	45	52	59	61	68	83
2-MN-SVO-45+	15	37	28	34	18	51	52	57
2-SA-SVO-0-14	27	64	30	42	37	48	55	53
2-SA-SVO-15-44	15	40	29	41	41	19	13	46
2-SA-SVO-45+	29	50	43	46	59	89	48	48
2-ES-SVO-45+	86	98	99	60	82	74	72	90
2-WS-SVO-15-44	11	46	28	41	39	27	15	13
3-EN-SVO-15-44	27	23	28	28	31	22	19	14
3-EN-SVO-45+	63	73	67	57	75	64	60	61
3-SA-SVO-15-44	38	50	42	44	59	39	37	48
3-SA-SVO-45+	28	63	32	55	45	62	60	36
4-SA-SVO-15-44	52	67	56	55	74	52	51	53
4-SA-SVO-45+	25	1	40	51	57	70	41	190

^aValue in parentheses calculated from HRGC/ECO data.
^bCompound search hindered by instrument saturation.

Table 43. Summary of Surrogate Compound Recoveries (%) From the FY82 QA/QC Samples, for Human Adipose

MRI Sample No.	Matrix	d ₈ -Naphthalene	Surrogate compounds					
			¹³ C ₆ -1,2,4,5-Tetrachlorobenzene	¹³ C ₆ -Hexa-chlorobenzene	¹³ C ₁₂ -3,3',4,4'-Tetrachlorobiphenyl	¹³ C ₁₂ -Octa-chlorobiphenyl	¹³ C ₁₂ -Octa-chlorobiphenyl	¹³ C ₁₂ -Deca-chlorobiphenyl
201	solvent	40	120	41	61	56	160	140
202	solvent	43	170	48	77	76	210	210
203	solvent	39	100	44	69	57	120	72
205	porcine fat	87	170	92	77	83	100	670
206	solvent	72	130	70	32	75	100	440
207	human adipose	76	110	77	79	90	110	44
208	human adipose	82	100	86	89	97	92	240
209	human adipose	130	54	83	66	83	65	88
210	human adipose	35	110	39	51	44	110	92
211	human adipose	48	64	57	62	67	72	47
212	human adipose	20	130	24	32	25	130	150
213	solvent	22	61	28	47	40	58	56
214	solvent	66	70	63	70	70	73	87
216	porcine fat	68	100	68	55	63	100	120
217	porcine fat	100	550	110	85	97	270	410
218	solvent	93	170	80	100	97	150	160
219	solvent	63	30	16	78	81	100	160
220	solvent	87	240	79	58	56	140	94
221	solvent	63	120	56	78	67	93	45
222	solvent	34	160	42	39	33	53	83
225	human adipose	37	36	31	29	24	45	52
227	human adipose	90	140	100	79	55	58	49
228	porcine fat	48	57	48	60	48	73	82
229	human adipose	54	51	52	47	41	52	7
230	human adipose	37	48	34	34	24	40	39
231	human adipose	26	43	32	39	32	42	28
232	human adipose	70	53	65	45	54	53	52

Table 43 (continued)

MRI Sample No.	Matrix	Surrogate compounds						
		¹³ C ₆ -1,2,4,5-Tetrachlorobenzene	¹³ C ₆ -Hexa-chlorobenzene	¹³ C ₆ -4-Chloro-biphenyl	¹³ C ₁₂ -3,3',4,4'-Tetrachlorobiphenyl	¹³ C ₁₂ -Octa-chlorobiphenyl	¹³ C ₁₂ -Deca-chlorobiphenyl	
233	human adipose	59	40	57	65	61	49	8
234	human adipose	38	47	40	46	31	50	33
235	human adipose	26	28	27	29	22	32	6
236	solvent	57	98	64	57	58	90	72
237	solvent	ND	90	ND	20	11	95	14
238	solvent	48	73	50	44	44	68	110
239	human adipose	18	18	21	43	26	65	86
240	human adipose	26	25	24	39	23	30	81
241	human adipose	59	42	60	56	57	37	3
243	human adipose	44	22	40	44	35	46	30
245	human adipose	38	33	38	48	45	42	53
247	human adipose	56	31	58	54	32	42	33
248	human adipose	58	34	57	56	60	68	44
249	human adipose	14	18	15	20	13	39	42
						31	49	33
						21	21	37
							41	37

As noted in Figure 21, the $^{13}\text{C}_{12}$ -decachlorobiphenyl and the octachloronaphthalene elute within a narrow retention window as compared to the retention window for anthracene-d₁₀ and the surrogate. These results suggest that additional internal standards are necessary to provide better quantitation in the broad scan analysis scheme. Estimates of the recoveries of the $^{13}\text{C}_6$ -monochloro- and $^{13}\text{C}_{12}$ -octachlorobiphenyl surrogates by HRGC/ECD are difficult because of coelution of other compounds.

G. Internal Standard Response

The response of the internal quantitation standard anthracene-d₁₀ was routinely monitored and recorded to determine if there were apparent problems resulting from instrument stability. If drastic changes (greater than 50% of standard) in the anthracene-d₁₀ response were noted, the HRGC/MS analyst was required to reanalyze a calibration standard to determine if the response difference was due to instrument operation or sample extract matrix interferences.

A difference in the internal standard response was noted for the 6% and 15/50% Florisil fraction extracts. The differences were noted as significant changes in response when both the 6% and 15/50% extracts of a composite sample were analyzed within the same day. The internal standard response for the 15/50% was noted to range from 50 to 90% less than that observed for the calibration standards and 6% Florisil fractions. The difference in response is attributed to a sample matrix effect. Calibration standards and 6% Florisil extracts analyzed before and after the 15/50% Florisil extracts clearly demonstrated that the instrument stability was not responsible for the observed internal standard fluctuations.

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APPENDIX A

NHATS FY82 COMPOSITE SAMPLE DATA REPORTED FOR ALL
TARGET COMPOUNDS WITHIN A CENSUS DIVISION

Table A-1. Summary of the Total Mass of Selected Semivolatile Organic Compounds Determined in the Composited Human Adipose Tissues Representing the Mountain (M0) Census Division

Census division	Total $\mu\text{g}/\text{composite specimen}^{\text{a}}$		
	M0 - Mountain	(1)	(1)
Composite no.		(1)	(1)
Age group	0-14	15-44	45+
Wet tissue weight	9.0 g	18.3 g	21.0 g
% lipid	62.3	74.1	84.3
<u>Compound</u>			
Dichlorobenzene	ND (0.20)	ND (0.20)	ND (0.20)
Trichlorobenzene	ND (0.20)	ND (0.20)	ND (0.20)
Naphthalene	ND (0.20)	ND (0.20)	ND (0.20)
Pentachlorobenzene	ND (0.20)	ND (0.20)	ND (0.20)
Diethyl phthalate	b	ND (0.50)	0.87
Tributyl phosphate	b	ND (1.0)	ND (1.0)
Hexachlorobenzene	ND (0.20)	0.31	0.59
β -BHC	ND (0.20)	1.5	4.6
Phenanthrene	ND (0.20)	ND (0.20)	ND (0.20)
Di-n-butyl phthalate	b	ND (2.4)	ND (0.20)
Heptachlor epoxide	ND (0.20)	ND (0.20)	1.0
Pyrene	ND (0.20)	ND (0.20)	ND (0.20)
<i>trans</i> -Nonachlor	ND (0.40)	ND (0.40)	2.8
p,p'-DDE	5.1	8.1	24
Dieldrin	ND (1.0)	ND (1.0)	ND (1.0)
p,p'-DDT	tr 0.21	0.90	2.4
Butylbenzyl phthalate	b	3.6	7.8
Triphenyl phosphate	b	tr 0.89	9.6
Di-n-octyl phthalate	b	ND (0.20)	ND (12.2)
Mirex	ND (0.20)	ND (0.20)	ND (0.20)
Tris (2-chloroethyl) phosphate	b	ND (0.80)	ND (0.80)
Total PCB's	ND (0.20)	1.2	11
Trichlorobiphenyl	ND (0.20)	ND (0.20)	ND (0.20)
Tetrachlorobiphenyl	ND (0.20)	ND (0.20)	tr 0.44
Pentachlorobiphenyl	ND (0.40)	ND (0.40)	tr 2.2
Hexachlorobiphenyl	ND (0.40)	tr 1.2	4.8
Heptachlorobiphenyl	ND (0.40)	ND (0.40)	3.3
Octachlorobiphenyl	ND (0.40)	ND (0.40)	ND (0.40)
Nonachlorobiphenyl	ND (0.40)	ND (0.40)	ND (0.40)
Decachlorobiphenyl	ND (1.0)	ND (1.0)	ND (1.0)

^aND = not detected. Value in parentheses is the estimated limit of detection (LOD).

^btr = trace. The compound is present at a level between LOD and LOQ.

^cData not summarized.

Table A-2. Summary of the Total Mass of Selected Semivolatile Organic Compounds Determined in the Composited Human Adipose Tissues Representing the New England (NE) Census Division

Census division	Total µg/composite specimen ^a		
	NE - New England		
Composite no.	(1)	(1)	(1)
Age group	0-14	15-44	45+
Wet tissue weight	19.1 g	21.9 g	26.7 g
% lipid	55.1	87.6	79.2
<u>Compound</u>			
Dichlorobenzene	ND (0.20)	ND (0.20)	tr 0.77
Trichlorobenzene	ND (0.20)	ND (0.20)	ND (0.20)
Naphthalene	ND (0.20)	tr 0.60	ND (0.20)
Pentachlorobenzene	ND (0.20)	ND (0.20)	ND (0.20)
Diethyl phthalate	tr 0.34	tr 0.32	tr 0.38
Tributyl phosphate	ND (1.0)	ND (1.0)	ND (1.0)
Hexachlorobenzene	ND (0.20)	24	tr 0.31
β-BHC	ND (0.20)	11	2.0
Phenanthrene	ND (0.20)	ND (0.20)	ND (0.20)
Di-n-butyl phthalate	ND (0.20)	ND (0.20)	tr 0.28
Heptachlor epoxide	ND (0.20)	4.48	ND (0.20)
Pyrene	ND (0.20)	ND (0.20)	ND (0.20)
trans-Nonachlor	ND (0.40)	9.9	ND (0.40)
p,p'-DDE	1.4	47	20
Dieldrin	ND (1.0)	ND (1.0)	ND (1.0)
p,p'-DDT	ND (0.20)	6.8	7.1
Butylbenzyl phthalate	ND (0.20)	ND (0.20)	ND (0.20)
Triphenyl phosphate	ND (0.40)	ND (0.40)	ND (0.40)
Di-n-octyl phthalate	tr 0.69	tr 0.24	ND (0.20)
Mirex	ND (0.20)	tr 0.70	tr 0.60
Tris (2-chloroethyl) phosphate	ND (0.80)	ND (0.80)	ND (0.80)
Total PCB's	ND (0.20)	2.0	3.4
Trichlorobiphenyl	ND (0.20)	ND (0.20)	ND (0.20)
Tetrachlorobiphenyl	ND (0.20)	tr 0.36	tr 0.23
Pentachlorobiphenyl	ND (0.40)	tr 0.46	tr 2.72
Hexachlorobiphenyl	ND (0.40)	tr 1.2	ND (0.40)
Heptachlorobiphenyl	ND (0.40)	ND (0.40)	ND (0.40)
Octachlorobiphenyl	ND (0.40)	ND (0.40)	tr 0.43
Nonachlorobiphenyl	ND (0.40)	ND (0.40)	ND (0.40)
Decachlorobiphenyl	ND (1.0)	ND (1.0)	ND (1.0)

^aND = not detected. Value in parentheses is the estimated limit of detection (LOD).
tr = trace. The compound is present at a level between LOD and LOQ.

Table A-3. Summary of the Total Mass of Selected Semivolatile Organic Compounds Determined in the Composited Human Adipose Tissues Representing the Pacific (PA) Census Division

Census division	Total $\mu\text{g}/\text{composite specimen}^{\text{a}}$	
	PA - Pacific	(1)
Composite no.		(1)
Age group	0-14	45+
Wet tissue weight	19.7 g	22.0 g
% lipid	62.9	19.2
<u>Compound</u>		
Dichlorobenzene	ND (0.20)	ND (0.20)
Trichlorobenzene	ND (0.20)	ND (0.20)
Naphthalene	ND (0.20)	tr 0.20
Pentachlorobenzene	ND (0.20)	ND (0.20)
Diethyl phthalate	ND (0.45)	ND (0.49)
Tributyl phosphate	ND (1.0)	ND (1.0)
Hexachlorobenzene	tr 0.37	1.7
β -BHC	tr 0.48	b
Phenanthrene	ND (0.20)	ND (0.20)
Di-n-butyl phthalate	ND (0.76)	ND (2.6)
Heptachlor epoxide	ND (0.20)	ND (0.20)
Pyrene	ND (0.20)	ND (0.20)
<u>trans</u> -Nonachlor	ND (0.40)	ND (0.40)
p,p'-DDE	3.2	ND (0.20)
Dieldrin	ND (1.0)	ND (1.0)
p,p'-DDT	tr 0.27	ND (0.20)
Butylbenzyl phthalate	ND (0.20)	1.7
Triphenyl phosphate	ND (0.40)	ND (0.40)
Di-n-octyl phthalate	ND (2.3)	16
Mirex	ND (0.20)	ND (0.20)
Tris (2-chloroethyl) phosphate	ND (0.80)	ND (0.80)
Total PCB's	ND (0.20)	6.7
Trichlorobiphenyl	ND (0.20)	ND (0.20)
Tetrachlorobiphenyl	ND (0.20)	ND (0.20)
Pentachlorobiphenyl	ND (0.40)	tr 0.71
Hexachlorobiphenyl	ND (0.40)	tr 0.44
Heptachlorobiphenyl	ND (0.40)	2.8
Octachlorobiphenyl	ND (0.40)	2.2
Nonachlorobiphenyl	ND (0.40)	tr 0.56
Decachlorobiphenyl	ND (1.0)	ND (1.0)

^aND = not detected. Value in parentheses is the estimated limit of detection (LOD).

^btr = trace. The compound is present at a level between LOD and LOQ.

Data not summarized.

Table A-4. Summary of the Total Mass of Selected Semivolatile Organic Compounds Determined in the Composited Human Adipose Tissues Representing the Middle Atlantic (MA) Census Division

Census division Composite no.	Age group	Wet tissue weight (g)	% Lipid	Compound	Total ug/composite specimen ^a			
					MA (1)	MA (2)	MA (1)	MA (2)
Dichlorobenzene	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Trichlorobenzene	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Naphthalene	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Pentachlorobenzene	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Diethyl phthalate	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Triethyl phosphate	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (0.41)	ND (0.41)	ND (0.20)	ND (0.20)
Hexachlorobenzene	tr 0.44	tr 0.25	tr 0.25	tr 0.25	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
β -BHC	1.6	1.5	1.5	1.5	11	tr 0.39	ND (1.0)	ND (1.0)
Phenanthrene	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	9.1	tr 0.40	ND (0.20)	ND (0.20)
Di-n-butyl phthalate	tr 0.21	ND (0.20)	tr 0.48	ND (0.20)	1.4	ND (0.20)	2.0	ND (0.20)
Heptachlor epoxide	tr 0.58	tr 0.40	tr 0.72	tr 0.72	66	tr 0.26	ND (0.20)	ND (0.20)
Pyrene	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	6.3	tr 0.57	tr 0.62	ND (0.20)
trans-Nonachlor	tr 0.86	tr 0.80	tr 0.80	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
α , β -TDE	15	9.3	45	9.8	tr 1.00	tr 0.92	ND (0.20)	ND (0.20)
Bieidrin	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	4.8	7.5	10	ND (0.40)
p,p'-DDT	1.0	0.63	0.63	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (0.94)
Butylbenzyl phthalate	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	0.82	9.2	ND (0.20)	ND (0.20)
Triphenyl phosphate	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	3.8	8.7	ND (0.20)	ND (0.20)
Di-n-octyl phthalate	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	1.1	ND (0.20)	tr 0.21	ND (0.20)
Mirex	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Tris(2-chloroethyl) phosphate					ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)
Total PCBs	3.4	2.5	4.5	5.3	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Trichlorobiphenyl	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	tr 0.51	tr 0.39	tr 0.39	tr 0.39
Tetrachlorobiphenyl	tr 0.51	tr 0.39	tr 0.63	tr 0.63	tr 1.3	tr 0.70	tr 1.4	tr 1.4
Pentachlorobiphenyl	tr 1.3	tr 0.70	tr 1.4	tr 1.4	tr 1.6	tr 1.4	tr 2.0	tr 2.0
Hexachlorobiphenyl	tr 1.6	tr 1.4	tr 1.4	tr 1.4	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Heptachlorobiphenyl	ND (0.40)	ND (0.40)	tr 0.46	tr 0.46	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Octachlorobiphenyl	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Nonachlorobiphenyl	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Decachlorobiphenyl	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)

^aND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

bData not summarized.

Table A-5. Summary of the Total Mass of Selected Semivolatile Organic Compounds Determined in the East North Central (EN) Census Division Human Adipose Tissues Representing the East North Central (EN) Census Division

Census division Composite no.	EN			Total µg/composite specimen ^a		
	EN (1)	EN (2)	EN (1)	EN (2)	EN (3)	EN (1)
Age group	0-14	0-14	15-44	15-44	15-44	ND (0.20)
Wet tissue weight (g)	18.1	21.2	21.6	21.4	20.2	ND (0.20)
% Lipid	48.6	69.3	75.5	83.2	83.2	ND (0.20)
Compound						
Dichlorobenzene	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	tr 0.49	ND (0.20)
Trichlorobenzene	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Naphthalene	ND (0.20)	ND (0.20)	tr 0.21	ND (0.20)	tr 0.25	tr 0.34
Pentachlorobenzene	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Diethyl phthalate	ND (0.43)	8.6	ND (0.33)	ND (0.20)	ND (0.20)	ND (0.20)
Trityl phosphate	ND (1.0)	tr 1.8	ND (1.0)	1.2	b	ND (0.60)
Hexachlorobenzene	ND (0.20)	ND (0.20)	tr 0.51	ND (1.0)	tr 0.46	ND (0.20)
β-BHC	ND (0.20)	tr 0.42	tr 0.51	ND (0.20)	ND (1.0)	ND (1.0)
Phenanthrene	ND (0.20)	tr 0.34	1.3	tr 0.63	3.8	tr 0.47
Di-n-butyl phthalate	ND (1.3)	26	ND (1.2)	ND (0.20)	ND (0.20)	ND (0.20)
Heptachlor epoxide	ND (0.20)	tr 0.26	ND (0.20)	7.9	b	ND (0.54)
Pyrene	ND (0.20)	ND (0.20)	tr 0.36	tr 0.45	tr 0.54	4.5
trans-Nonachloror	ND (0.40)	ND (0.40)	ND (0.20)	ND (0.20)	tr 1.1	14
P,P'-DDT	1.1	2.2	8.3	tr 0.44	ND (0.20)	ND (0.20)
Diehrin	ND (1.0)	ND (1.0)	ND (1.0)	3.3	5.8	1.9
P,P'-DDT	ND (0.20)	tr 0.28	1.6	tr 0.52	b	ND (1.0)
Butylbenzyl phthalate	ND (1.4)	tr 0.32	ND (0.20)	15	b	ND (0.20)
Triphenyl phosphate	ND (0.40)	1070	ND (0.40)	9.0	b	tr 0.24
Di-n-octyl phthalate	ND (2.0)	ND (3.3)	ND (0.82)	6.1	ND (0.40)	7.0
Mirex	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.98)	tr 0.99
Tris(2-chloroethyl)phosphate	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.20)	ND (0.20)	ND (0.20)
Total PCBs	ND (0.20)	ND (0.20)	1.1	1.8	1.3	5.6
Trichlorobiphenyl	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	tr 0.30	ND (0.81)
Tetrachlorobiphenyl	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	tr 0.30	15
Pentachlorobiphenyl	ND (0.40)	ND (0.40)	tr 0.22	ND (0.20)	tr 0.40	7.5
Hexachlorobiphenyl	ND (0.40)	ND (0.40)	tr 0.56	tr 0.48	0.90	0.28
Heptachlorobiphenyl	ND (0.40)	ND (0.40)	tr 1.0	tr 0.80	2.4	0.74
Octachlorobiphenyl	ND (0.40)	ND (0.40)	tr 0.65	ND (0.40)	5.4	1.4
Nonachlorobiphenyl	ND (0.40)	ND (0.40)	tr 0.49	ND (0.40)	2.6	2.8
Decachlorobiphenyl	ND (1.0)	ND (1.0)	ND (0.40)	ND (0.40)	1.6	1.8

^aND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

^bData not summarized.

Table A-6. Summary of the Total Mass of Selected Semivolatile Organic Compounds Determined in the Composited Human Adipose Tissues Representing the West North Central (WN) Census Division

Census division		Total/ug/composite specimen	WN	WN	WN
Composite no.			(1)	(1)	(1)
Age group			0-14	15-44	45+
Wet tissue weight (g)			23.4	20.6	22.5
% Lipid			63.1	76.2	89.8
Compound					
Dichlorobenzene			ND (0.20)	ND (0.20)	ND (0.20)
Trichlorobenzene			ND (0.20)	ND (0.20)	ND (0.20)
Naphthalene			tr 0.20	ND (0.20)	tr 0.30
Pentachlorobenzene			ND (0.20)	ND (0.20)	ND (0.20)
Diethyl phthalate			ND (0.20)	ND (0.20)	ND (0.20)
Tributyl phosphate			ND (0.20)	1.2	tr 0.64
Hexachlorobenzene			ND (1.0)	ND (1.0)	ND (1.0)
β -BHC			tr 0.59	tr 0.52	tr 1.0
Phenanthrene			ND 0.77	1.9	6.0
Di-n-butyl phthalate			ND (0.20)	ND (0.20)	ND (0.20)
Heptachlor epoxide			2.1	ND (0.20)	ND (2.4)
Pyrene			tr 0.41	tr 0.73	tr 1.15
trans-Nonachloror			ND (0.20)	ND (0.20)	ND (0.20)
P,P'-DDT			ND (0.40)	tr 0.54	tr 1.52
Dieletrin			4.4	15	31
P,P'-DDT			tr 1.9	tr 2.21	7.74
Butylbenzyl phthalate			b	ND (0.20)	ND (1.40)
Triphenyl phosphate			3.0	1.9	2.4
Di- α -octyl phthalate			ND (0.75)	ND (0.96)	ND (4.3)
Mirex			ND (0.20)	ND (0.20)	23
Tri(2-chloroethyl) phosphate			ND (0.20)	ND (0.20)	ND (3.5)
Total PCBs			ND (0.81)	ND (0.81)	ND (0.81)
Trichlorobiphenyl			1.6	5.8	17
Pentachlorobiphenyl			ND (0.20)	ND (0.20)	ND (0.20)
Heptachlorobiphenyl			tr 0.62	tr 0.48	tr 1.1
Octachlorobiphenyl			tr 1.00	tr 0.98	tr 3.2
Nonachlorobiphenyl			ND (0.40)	tr 2.7	tr 6.4
Decachlorobiphenyl			ND (0.40)	tr 1.2	tr 3.5
			ND (1.0)	tr 0.46	tr 1.5
				ND (0.40)	ND (0.40)
				ND (1.0)	ND (1.0)

a ND = not detected. Value in parentheses is the estimated limit of detection (LOD). b tr = trace.

The compound is present at a level between LOD and 100.

Data not summarized.

Table A-7. Summary of the Total Mass of Selected Semivolatile Organic Compounds Determined in the Composited Human Adipose Tissues Representing the South Atlantic (SA) Census Division

Census division Composite no.	SA (1)	SA (2)	SA (1)	SA (2)	SA (3)	SA (1)	SA (2)	SA (3)	SA (4)	SA (4)
Age group	0-14	15-44	15-44	15-44	17.9	20.0	26.1	18.0	18.2	17.6
Wet tissue weight (g)	20.7	19.1	26.4	19.5	70.4	82.5	83.9	86.7	12.0	70.5
% Lipid	83.9	69.1	86.4	89.3						
Compound										
Dichlorobenzene	ND (0.20)									
Trichlorobenzene	ND (0.20)									
Naphthalene	1.1	tr 0.41	ND (0.16)	ND (0.20)	tr 0.67	tr 0.48	b	ND (0.20)	tr 0.28	ND (0.20)
Pentachlorobenzene	ND (0.20)									
Diethyl phthalate	ND (1.3)	ND (0.20)	ND (0.90)	tr 0.49	tr 0.49	ND (0.20)				
Tributyl phosphate	ND (0.10)	ND (1.0)	b	ND (0.20)						
Hexachlorobenzene	tr 0.66	ND (0.20)	tr 0.73	tr 0.20	tr 0.24	1.2	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
B-BHC	3.5	tr 0.59	2.2	1.1	0.95	4.7	b	tr 0.27	tr 0.23	tr 0.46
Phenanthrene	ND (0.20)	b	3.2	2.2						
Di-n-butyl phthalate	ND (1.8)	2.0	ND (3.3)	1.7	1.3	ND (0.20)	ND (0.20)	b	ND (0.20)	ND (0.20)
Heptachlor epoxide	tr 0.54	ND (0.20)	ND (0.20)	tr 0.58	tr 0.33	ND (0.20)	ND (0.20)	11	ND (1.2)	b
Pyrene	ND (0.20)	b	tr 0.43	tr 0.64						
trans-Nonachlor	tr 0.70	ND (0.40)	ND (0.40)	b	tr 1.20	ND (0.40)	ND (0.20)	b	ND (0.20)	ND (0.20)
P,p'-DDT	7.3	4.6	12	8.9	18	16	1.6	tr 0.41	tr 1.2	ND (0.40)
Dieleadrin	ND (1.0)	ND (1.0)	ND (1.0)	tr 2.31	ND (1.0)	tr 1.1	5.93	ND (1.0)	20	tr 0.43
p,p'-DDT	1.1	tr 0.72	1.6	2.2	6.8	2.4	b	ND (0.20)	b	ND (1.0)
Butylbenzyl phthalate	tr 0.56	4.2	2.0	3.6	tr 0.28	1.6	10	tr 0.20	b	ND (0.20)
Triphenyl phosphite	ND (0.40)	tr 1.2	ND (0.40)	1.6	ND (0.40)	ND (0.40)	1.6	ND (0.40)	b	ND (0.40)
Di-n-octyl phthalate	ND (0.20)	7.9	ND (6.8)	ND (0.20)	ND (1.9)	ND (0.20)	ND (0.74)	tr 0.27	b	ND (0.27)
Mirex	ND (0.20)	ND (0.80)	ND (0.80)	tr 0.22	ND (0.20)	tr 0.31	ND (0.20)	tr 0.58	ND (0.20)	ND (0.20)
Tris(2-chloroethyl)-phosphate	ND (0.80)									
Total PCBs	1.6	ND (0.20)	3.3	6.1	6.4	2.7	14	16	4.0	21
Trichlorobiphenyl	ND (0.20)	ND (0.20)	ND (0.20)	tr 0.20	ND (0.17)	tr 0.38	tr 0.20	ND (0.20)	ND (0.20)	tr 0.41
Tetrachlorobiphenyl	ND (0.20)	ND (0.20)	ND (0.20)	tr 0.76	ND (0.24)	tr 0.1	0.98	tr 0.72	0.36	1.2
Pentachlorobiphenyl	tr 0.59	ND (0.40)	ND (0.40)	1.28	1.6	1.1	0.60	2.3	0.86	2.3
Hexachlorobiphenyl	tr 0.98	ND (0.40)	tr 0.42	3.0	2.6	ND (0.40)	4.5	7.0	2.0	4.4
Heptachlorobiphenyl	ND (0.40)	ND (0.40)	ND (0.40)	1.6	tr 0.50	tr 1.5	tr 0.83	2.3	2.5	tr 0.78
Octachlorobiphenyl	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	tr 0.92	tr 0.87	tr 1.0	tr 0.70	ND (0.40)	1.9
Nonachlorobiphenyl	ND (0.40)	ND (0.40)	ND (1.0)	ND (1.0)	ND (0.40)	ND (1.0)	ND (1.0)	ND (0.40)	ND (0.40)	4.9
Decachlorobiphenyl	ND (1.0)				ND (1.0)	3.8				

^aND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

^bData not summarized.

Table A-8. Summary of the Total Mass of Selected Semivolatile Organic Compounds Determined in the Composited Human Adipose Tissues Representing the East South Central (ES) Census Division

Census division Composite no.	Age group	Wet tissue weight (g)	%	Lipid	Total µg/composite specimen ^a			
					ES (1)	ES (1)	ES (1)	ES (2)
Dichlorobenzene					ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Trichlorobenzene					DN (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Naphthalene					ND (0.20)	tr 0.27	ND (0.20)	ND (0.20)
Pentachlorobenzene					ND (0.20)	ND (0.20)	ND (0.20)	tr 0.36
Diethyl phthalate					1.8	ND (0.20)	ND (0.20)	ND (0.20)
Tributyl phosphate					ND (1.0)	2.1	b	ND (0.20)
Hexachlorobenzene					tr 0.59	ND (1.0)	b	ND (0.20)
β -BHC					8.5	tr 0.42	tr 0.47	ND (1.0)
Phenanthrene					tr 0.20	6.8	tr 9.8	tr 0.42
Di-n-butyl phthalate					3.4	ND (0.20)	tr 0.31	4.6
Heptachlor epoxide					tr 0.30	2.8	b	ND (0.20)
Pyrene					ND (0.20)	2.8	tr 0.62	ND (0.20)
trans-Nonachlor					tr 1.5	ND (0.20)	ND (0.20)	ND (0.20)
Σ DDE					38	4.6	4.1	2.9
Gieldrin					tr 3.1	46	43	39
Σ -DDT					9.0	11.4	ND (1.0)	ND (1.0)
Butylbenzyl phthalate					7.6	b	b	6.2
Triphenyl phosphate					2.7	9.4	ND (0.20)	ND (0.20)
Di-n-octyl phthalate					ND (2.0)	3.3	b	ND (0.40)
Mirex					ND (0.20)	2.1	b	ND (0.20)
Tris(2-chloroethyl) phosphate					ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)
Total PCBs					7.6	18	3.3	25
Trichlorobiphenyl					tr 0.20	ND (0.20)	ND (0.20)	ND (0.20)
Tetrachlorobiphenyl					ND (0.20)	tr 0.68	ND (0.20)	ND (0.20)
Pentachlorobiphenyl					ND (0.40)	tr 4.4	tr 1.2	2.8
Hexachlorobiphenyl					4.5	7.2	ND (0.40)	8.6
Heptachlorobiphenyl					1.8	3.2	tr 0.42	6.4
Octachlorobiphenyl					1.1	1.7	tr 1.3	5.2
Nonachlorobiphenyl					ND (0.40)	tr 0.68	tr 0.40	tr 1.1
Decachlorobiphenyl					ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)

^aND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace.

^bData between LOD and LOQ.

Data not summarized.

Table A-9. Summary of the Total Mass of Selected Semivolatile Organic Compounds Determined in the Composited Human Adipose Tissues Representing the West South Central (WS) Census Division

Census division Composite no.	Age group	Wet tissue weight (g)	% Lipid	Compound	Total µg/composite specimen ^a			
					WS (1)	WS (2)	WS (1)	WS (1)
Dichlorobenzene				ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Trichlorobenzene				ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Naphthalene				tr 0.27	tr 0.52	ND (0.20)	ND (0.20)	ND (0.20)
Pentachlorobenzene				ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Diethyl phthalate				ND 7.2	8.5	ND (0.20)	ND (0.20)	ND (0.20)
Tributyl phosphate				ND (1.0)	ND (1.0)	ND (0.20)	ND (0.20)	ND (0.20)
Hexachlorobenzene				ND (0.20)	tr 0.69	ND (1.0)	ND (1.0)	ND (1.0)
B-BHC				tr 0.43	6.6	tr 0.43	tr 0.43	tr 0.43
Phenanthrene				ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Di-n-butyl phthalate				17	ND (2.5)	ND (0.20)	ND (0.20)	ND (0.20)
Heptachlor epoxide				ND (0.20)	1.0	tr 0.73	tr 0.73	tr 0.73
Pyrene				ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
trans-Nonachlor				ND (0.40)	tr 1.1	tr 1.1	tr 1.1	tr 1.1
P,P'-DDDE				6.1	23	1.1	1.1	1.1
Dieledrin				ND (1.0)	3.0	ND (1.0)	ND (1.0)	ND (1.0)
P,P'-DDT				0.34	b	ND (0.20)	ND (0.20)	ND (0.20)
Butylbenzyl phthalate				13	2.1	2.4	2.4	2.4
Triphenyl phosphate				ND (4.4)	ND (1.9)	ND (4.4)	ND (4.4)	ND (4.4)
Di-n-octyl phthalate				19	5.8	1.5	1.5	1.5
Mirex				ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Tris(2-chloroethyl) phosphate				tr 1.6	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)
Total PCBs				0.97	4.4	0.70	0.70	0.70
Trichlorobiphenyl				ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Tetrachlorobiphenyl				ND (0.20)	tr 0.35	tr 0.30	tr 0.30	tr 0.30
Pentachlorobiphenyl				ND (0.40)	tr 0.88	tr 0.60	tr 0.60	tr 0.60
Hexachlorobiphenyl				tr 0.45	2.2	tr 1.5	tr 1.5	tr 1.5
Heptachlorobiphenyl				ND (0.40)	tr 0.96	tr 0.54	tr 0.54	tr 0.54
Octachlorobiphenyl				tr 0.52	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Nonachlorobiphenyl				ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Decachlorobiphenyl				ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)

^aND = not detected. Value in parentheses is the estimated limit of detection (LOD). tr = trace. The compound is present at a level between LOD and LOQ.

bData not summarized.